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RESOURCE CONSERVATION AND RECOVERY ACT FACILITY ASSESSMENT SAMPLING VISIT WORK PLAN FOR GROUP 4 SOLID WASTE MANAGEMENT UNITS 47, 53, 54, 55 AND AREAS OF CONCERN A AND B NS MAYPORT FL

11/1/1995

ABB ENVIRONMENTAL SERVICES

RESOURCE CONSERVATION AND RECOVERY ACT FACILITY ASSESSMENT SAMPLING VISIT WORKPLAN

GROUP IV

SOLID WASTE MANAGEMENT UNITS 47, 53, 54, AND 55 AND AREAS OF CONCERN A AND B

U.S. NAVAL STATION MAYPORT, FLORIDA

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CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The Contractor, ABB Environmental Services, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/028 are complete and accurate and comply with all requirements of this contract.

DATE: November 02, 1995

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FOREWORD

To meet its mission objectives, the U.S. Navy performs a variety of operations, some requiring the use, handling, storage, or disposal of hazardous materials. Through accidental spills and leaks and conventional methods of past disposal, hazardous materials may have entered the environment in ways unacceptable by today's standards. With growing knowledge of the long-term effects of hazardous materials on the environment, the Department of Defense initiated various programs to investigate and remediate conditions related to suspected past releases of hazardous materials at their facilities.

One of these programs is the Installation Restoration (IR) program. This program complies with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act. The acts, passed by Congress in 1980 and 1986, respectively, established the means to assess and cleanup hazardous waste sites for both private-sector and Federal facilities. These acts are the basis for what is commonly known as the Superfund program.

Originally, the Navy's part of this program was called the Navy Assessment and Control of Installation Pollutants (NACIP) program. Early reports reflect the NACIP process and terminology. The Navy eventually adapted the program structure and terminology of the IR program.

The IR program is conducted in the following stages.

- The preliminary assessment (PA) identifies potential sites through record searches and interviews.
- A site inspection (SI) then confirms which areas contain contamination, constituting actual "sites." (Together, the PA and SI steps were called the Initial Assessment Study [IAS] under the NACIP program.)
- Next, the remedial investigation and the feasibility study (RI/FS) together determine the type and extent of contamination, establish criteria for cleanup, and identify and evaluate any necessary

remedial action alternatives and their costs. As part of the RI/FS, a risk assessment identifies potential effects on human health or the environment to help evaluate remedial action alternatives.

- The selected alternative is planned and conducted in the remedial design and remedial action stages. Monitoring then ensures the effectiveness of the effort.

A second program to address present hazardous material management is the Resource Conservation and Recovery Act (RCRA) Corrective Action Program. This program is designed to identify and cleanup releases of hazardous substances at RCRA-permitted facilities. RCRA is the law that ensures solid and hazardous wastes are managed in an environmentally sound manner. The law applies primarily to facilities that generate or handle hazardous waste.

This program is conducted in three stages.

- The RCRA facility assessment (confirmatory sampling) identifies solid waste management units (SWMUs), evaluates the potential for releases of contaminants, and determines the need for future investigations.

- The RCRA facility investigation then determines the nature, extent, and fate of contaminant releases.

- The corrective measures study identifies and recommends measures to correct the release.

The hazardous waste investigations at Naval Station Mayport are presently being conducted under the RCRA Corrective Action Program. Earlier preliminary investigations had been conducted at Naval Station Mayport under the NACIP program and IR program following Superfund guidelines. In 1988, in coordination with the U.S. Environmental Protection Agency (USEPA) Region IV and the Florida Department of Environmental Regulation (now the Florida Department of Environmental Protection [FDEP]), the hazardous waste investigations were formalized under the RCRA program.

Mayport is conducting the cleanup at their facility by working through the Southern Division, Naval Facilities Engineering Command. The USEPA and the FDEP oversee the Navy environmental program. All aspects of the program are conducted in compliance with State and Federal regulations, as ensured by the participation of these regulatory agencies.

Questions regarding the RCRA program at Naval Station Mayport should be addressed to Mr. David Driggers, Code 1852, at (803) 743-0501.

EXECUTIVE SUMMARY

This Resource Conservation and Recovery Act (RCRA) Facility Assessment Sampling Visit (RFA SV) workplan (confirmatory sampling) is prepared to address the sampling activities at the Group IV solid waste management units (SWMUs) 47, 53, 54, and 55 and areas of concern (AOCs) A and B in accordance with the RCRA Corrective Action Program at U.S. Naval Station Mayport as described in the Corrective Action Management Plan (CAMP). The original CAMP is located in Appendix F of Volume I of the RCRA Facility Investigation (RFI) Workplan (ABB Environmental Services, Inc., 1991), and the current CAMP was approved in March 1995. The Group IV SWMUs and AOCs requiring confirmatory sampling addressed in this RFA SV workplan are:

SWMU 47, Oily Waste Collection System;

SWMU 53, Sewer Pipelines;

SWMU 54, Oil-Water Separators;

SWMU 55, Storm Sewer and Drainage System;

AOC A, Fuel Distribution System; and

AOC B, Underground Product Storage Tanks.

The purpose of RFA SV sampling activities is to confirm whether or not contaminant releases have occurred. Releases of contaminants to the environment are suspected but not confirmed at SWMUs 47, 53, and 55, and confirmatory sampling is proposed for these SWMUS. No RFA SV sampling activities are proposed for SWMU 54 and AOCs A and B because they are being managed under Chapter 62-761, Florida Administrative Code (FAC) (Underground Storage Tank Systems) regulations. Any releases will be assessed, if necessary, in accordance with Chapter 62-770, FAC (State Underground Petroleum Environmental Response); the Florida Department of Environmental Protection is providing oversight. If, in the course of investigating these SWMUs under Chapter 62-761, nonpetroleum-based contamination is discovered, the SWMUs will return to the IR program. Brief descriptions of the SWMUs and AOCs are included in this RFA SV workplan because they are listed in the Hazardous and Solid Waste Amendments permit as requiring RFA SVs.

This RFA SV workplan proposes sampling techniques and locations to collect environmental samples from suspected affected media (sediment, soil, and groundwater) and analytical methods to confirm releases of contaminants to the environment. The analytical methods will address contaminants selected from the 40 Code of Federal Regulations (CFR) Part 264, Appendix IX, groundwater monitoring list and the U.S. Environmental Protection Agency Contract Laboratory Program target compound and target analyte lists. Analytical methods will include U.S. Environmental Protection Agency Method 8240 for volatile organic compounds, Method 8270 for semivolatile organic compounds, Method 8080 for chlorinated pesticides and polychlorinated biphenyls, and Methods 6010, 7420, 7470, and 9010 for inorganics.

Quality control and quality assurance, project organization, and health and safety protocols will follow the specifications described in the approved RFI workplan, as appropriate.

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
ADD	average daily dose
AIMD	Aircraft Intermediate Maintenance Department
AMI	Atlantic Marine, Inc.
AOC	area of concern
ARARs	applicable or relevant and appropriate requirements
ASTM	American Society for Testing and Materials
ATSDR	Agency for Toxic Substances and Disease Registry
bls	below land surface
CAMP	corrective action management plan
CAR	contamination assessment report
CARA	contamination assessment report addendum
CFR	Code of Federal Regulations
CPCs	contaminants of potential concern
CVAA	cold vapor atomic adsorption
DFM	diesel fuel, marine
DPT	direct push technology
DQO	data quality objective
DRF	Discharge Reporting Form
DRMO	Defense Reutilization and Marketing Office
ECD	Electron Capture Detector
ER-L	effects range-low
ER-M	effects range-median
ESE	Environmental Science and Engineering, Inc.
ESI	expanded site inspection
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FID	flame ionization detector
FFTC	Firefighting Training Center
GC	gas chromatograph
GC/MS	gas chromatography and mass spectroscopy
GFAA	graphite furnace atomic adsorption
GIR	general information report
GPR	ground penetrating radar
HASP	health and safety plan
HEAST	health effects assessment summary tables
HI	hazard index
HQ	hazard quotient
HSA	hollow-stem augers
HSO	Health and Safety Officer
HSWA	Hazardous and Solid Waste Amendments
IAS	initial assessment study
ICP	inductively coupled plasma

ID	inside diameter
IR	Installation Restoration
IRIS	Integrated Risk Information System
JSI	Jacksonville Shipyard, Inc.
LADD	lifetime average daily dose
mg/kg	milligrams per kilogram
MPT	Mayport
$\mu g/\ell$	micrograms per liter
NACIP	Navy Assessment and Control of Installation Pollutants
NAVSTA	Naval Station
NEESA	Naval Energy and Environmental Support Activity
NFSI	North Florida Shipyard, Inc.
NIRP	Navy Installation Restoration Program
NOEL	no observed effects level
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity units
OVA	organic vapor analyzer
OWCS	oil waste collection system
OWTP	oily waste treatment plant
PA	preliminary assessment
PCB	polychlorinated biphenyl
ppm	parts per million
psi	pounds per square inch
PVC	polyvinyl chloride
QA	quality assurance
QAPP	quality assurance program plan
QC	quality control
RAP	remedial action plan
RBC	risk based concentration
RCRA	Resource Conservation and Recovery Act
RFA	RCRA facility assessment
RfDs	reference doses
RFI	RCRA facility investigation
RI/FS	remedial investigation and feasibility study
SCs	screening concentrations
SCAPs	site characterization and analysis penetrometer system
SI	site inspection
SIMA	Shore Intermediate Maintenance Activity
SOUTHNAV-FACENGCOM	Southern Division, Naval Facilities Engineering Command
SMP	site management plan
SSL	soil screening level

GLOSSARY (Continued)

SV	sampling visit
SVOCs	semivolatile organic compounds
SWMU	solid waste management unit
TAL	target analyte list
TCL	target compound list
THI	total hazard index
TICs	tentatively identified compounds
TLV	threshold limit value
TM	technical memoranda
UCL	upper confidence limit
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOA	volatile organic analyte
VOC	volatile organic compound
VSI	visual site inspection
WWTF	wastewater treatment facility

1.0 INTRODUCTION

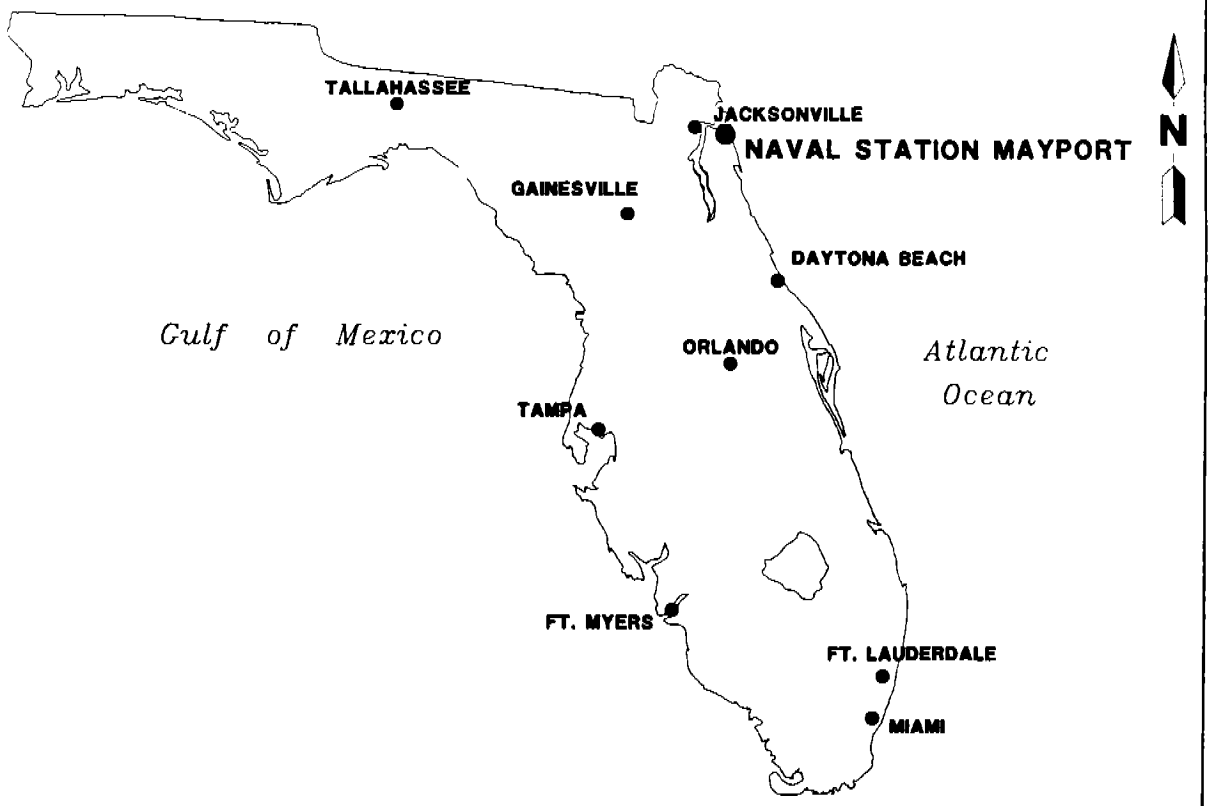
This workplan presents the background, approach, and data-gathering procedures for Resource Conservation and Recovery Act (RCRA) investigations of selected solid waste management units (SWMUs) at U.S. Naval Station (NAVSTA) Mayport, Florida. NAVSTA Mayport is located in northeastern Duval County, Florida, at the confluence of the St. Johns River and the Atlantic Ocean, as shown on Figure 1-1.

1.1 RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) CORRECTIVE ACTION PROGRAM

The U.S. Environmental Protection Agency (USEPA) issued RCRA permit No. HO16-118598 and Hazardous and Solid Waste Amendments (HSWA) permit FL9 170 024 260 to NAVSTA Mayport on March 25, 1988. The HSWA permit was revised and reissued on June 15, 1993. An RCRA facility assessment (RFA) visual site inspection (VSI) for NAVSTA Mayport was conducted on behalf of the USEPA Region IV by their contractor, A.T. Kearney, Inc. (A.T. Kearney, 1989). The RFA identified 56 SWMUs and 2 areas of concern (AOCs) at NAVSTA Mayport. Eighteen SWMUs were determined to require an RCRA Facility Investigation (RFI) because hazardous substance releases to the environment were confirmed and required further characterization to determine the nature and extent of contamination. Fifteen SWMUs were determined not to require further action because no release of hazardous substances to the environment had occurred. Twenty-three SWMUs were determined to require further investigation because hazardous substance releases to the environment were suspected but not confirmed. RFA sampling visits (SVs) have been conducted at 7 of these 23 sites to confirm the presence or absence of a release(s) to the environment (Table 1-1). SWMU 51 consists of petroleum underground storage tanks and appurtenances and is being managed under a different program of RCRA (e.g., 40 Code of Federal Regulations [CFR], Part 280, Subtitle C, Regulation of Underground Storage Tanks). The other 15 SWMUs will be investigated during subsequent RFA SVs.

Due to the number of SWMUs at NAVSTA Mayport, the diversity of their past and/or present operations, and the magnitude of permit requirements, the USEPA recommended that a phased approach be used to implement RFI, RFA SV, and other corrective action activities. A Corrective Action Management Plan (CAMP) was prepared that describes the phased approach, proposed schedule, and strategy to implement the RCRA Corrective Action Program at NAVSTA Mayport. The original CAMP is located in Appendix F of Volume I of the USEPA-approved RFI workplan (ABB Environmental Services, Inc. [ABB-ES], 1991). The CAMP identifies the operational groups of SWMUs, ranks them by their perceived relative risks to human health and the environment, and contains the proposed schedule for the field investigations and report submittals. A revised CAMP received regulatory approval in March 1995 (ABB-ES, 1995a).

Four SWMU groups are defined in the CAMP. SWMU Groups I through III are presented on Figure 1-2. These were defined by grouping individual SWMUs within a geographic area that have similar past waste management practices and the potential for similar corrective measures. Group IV SWMUs are not directly associated within a given geographic area, but consist of utility networks and systems that span multiple geographic areas across NAVSTA Mayport. These are not shown on Figure 1-2.



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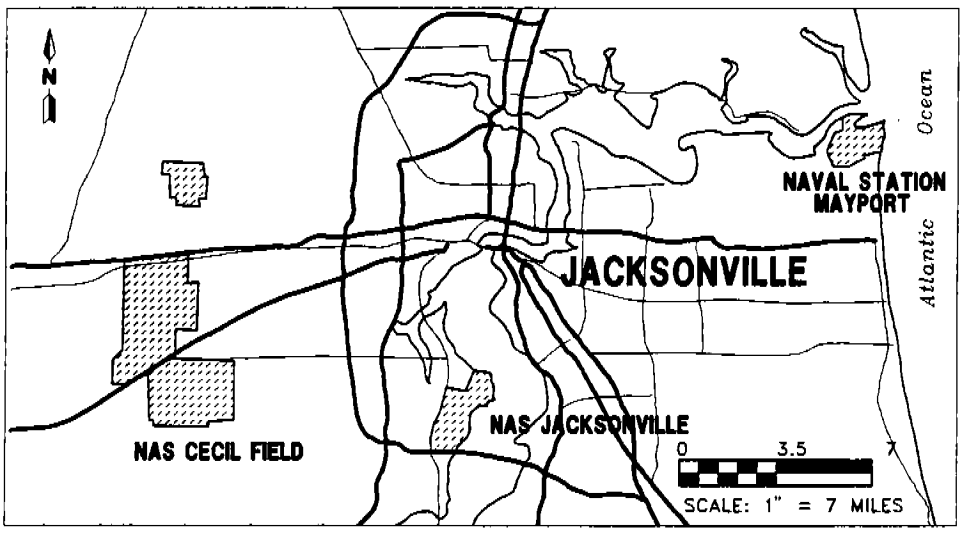

FIGURE 1-1
FACILITY LOCATION MAP

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RCRA FACILITY ASSESSMENT WORKPLAN, GROUP IV SWMUs

U.S. NAVAL STATION MAYPORT, FLORIDA

Table 1-1
Solid Waste Management Units Requiring a Resource Conservation and Recovery Act (RCRA) Facility Assessment Sampling Visit (RFA SV)

RFA SV Workplan, Group IV
U.S. Naval Station
Mayport, Florida

Group I RFA SV Solid Waste Management Units		RFA SV Conducted (Yes/No)
26	Landfill C	Yes
49	Flight Line Retention Ponds	Yes
50	East and West Dredge Spoil Disposal Areas	Yes[1]
56	Building 1552 Accumulation Area	Yes
Group II RFA SV Solid Waste Management Units		**RFA SV Conducted (Yes/No)**
19	Naval Aviation Depot (NADEP) Blasting Area	Yes
28	Defense Reutilization Marketing Office (DRMO) Yard	Yes
48	Former Chemistry Laboratory Accumulation Area	Yes
51	Waste Oil Tanks	No[1]
Group III RFA SV Solid Waste Management Units		**RFA SV Conducted (Yes/No)**
18	Fleet Training Center (FTC) Diesel Generator Sump	No
20	Hobby Shop Drain	No
21	Hobby Shop Scrap Storage Area	No
23	Jacksonville Shipyard, Inc. (JSI), Area	No
24	North Florida Shipyard, Inc. (NFSI), Area	No
25	Atlantic Marine, Inc. (AMI), Area	No
29	Oily Waste Pipeline Break	No[2]
44	Wastewater Treatment Facility Clarifiers 1 and 2	No
45	Sludge Drying Beds	No
46	Shore Intermediate Maintenance Activity (SIMA) Engine Drain Sump	No[2]
52	Public Works Department (PWD) Service Station Storage Area	No
Group IV RFA SV Solid Waste Management Units		**RFA SV Conducted (Yes/No)**
47	Oily Waste Collection System	No
53	Sewer Pipelines	No
54	Oil-Water Separators	No[1]
55	Storm Sewer and Drainage System	No
AOC A	Fuel Distribution System	No[1]
AOC B	Underground Product Storage Tanks	No[1,2]

[1] Solid waste management units (SWMUs) 51 and 54 and areas of contamination (AOCs) A and B are managed under Chapter 62-761 (Underground Storage Tank Systems) of the Florida Administrative Code (FAC).
[2] Releases at SWMUs 29 and 46 and AOC B have been investigated under Chapter 62-770 (State Underground Petroleum Environmental Response) FAC.

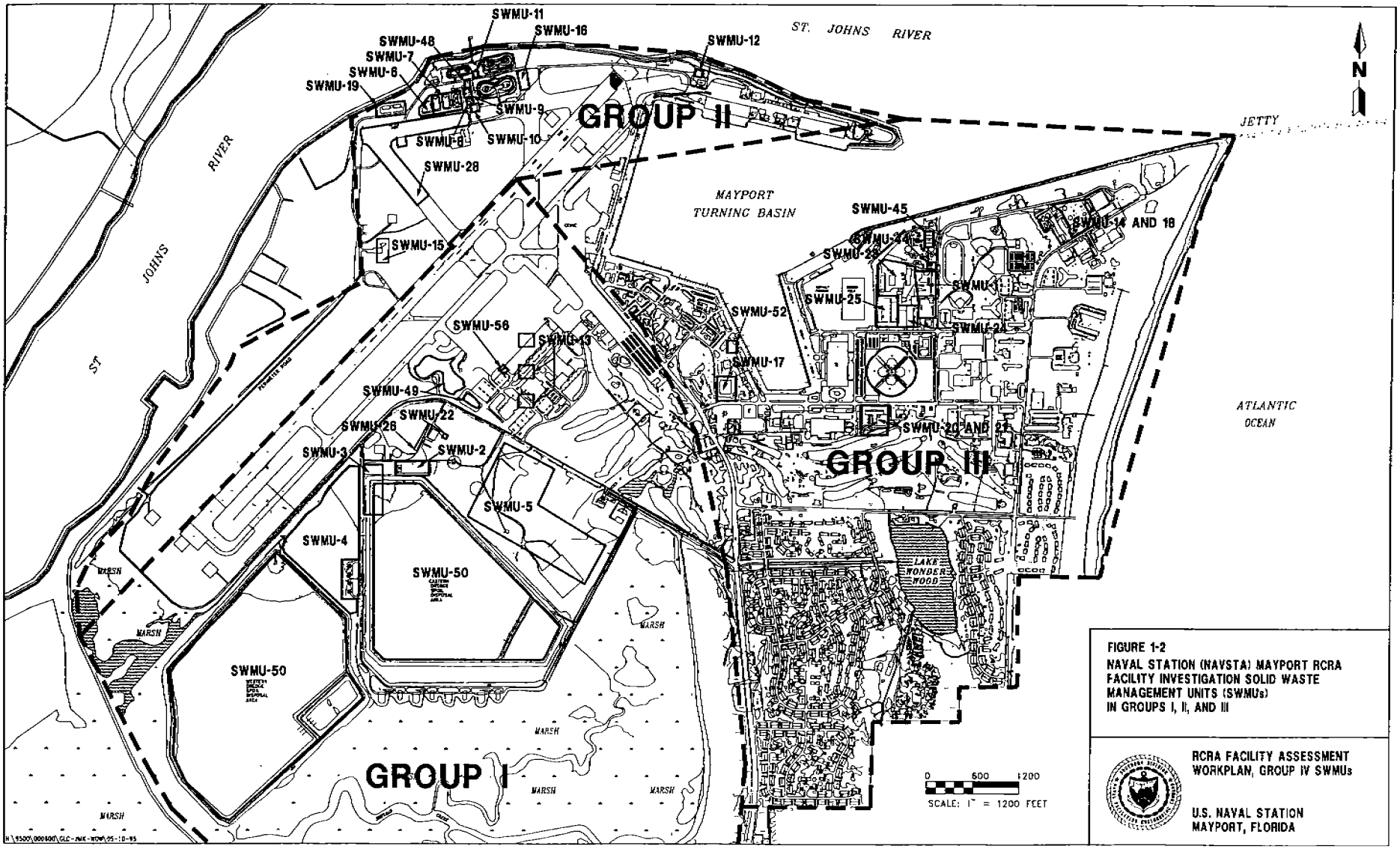

FIGURE 1-2
NAVAL STATION (NAVSTA) MAYPORT RCRA FACILITY INVESTIGATION SOLID WASTE MANAGEMENT UNITS (SWMUs) IN GROUPS I, II, AND III

RCRA FACILITY ASSESSMENT WORKPLAN, GROUP IV SWMUs

U.S. NAVAL STATION
MAYPORT, FLORIDA

The Group IV SWMUs and AOCs are located throughout the developed part of NAVSTA Mayport. Much of the utility networks to be investigated as part of Group IV are in close proximity to the Turning Basin. The SWMUs to be investigated in this group are related by the fact that they transport wastewater or petroleum-related liquids. Group IV SWMUs and AOCs include SWMUs 47, 53, 54, and 55 and AOCs A and B.

Previous investigations under the RCRA Corrective Action Program at NAVSTA Mayport include RFI and RFA SV activities at Groups I and II SWMUs (Figure 1-2). Current activities under the RCRA Corrective Action Program address the SWMUs located in the Group III SWMU area and include field investigative activities for both the RFI site characterizations and RFA SVs. Group IV SWMU area sites will be addressed in subsequent investigations as described in this workplan in accordance with the CAMP (ABB-ES, 1995a).

The RCRA Facility Investigation General Information Report (GIR) for NAVSTA Mayport (ABB-ES, 1995b) provides information common to all four SWMU groups being investigated, including background sampling information and analytical methodology, risk assessment approach, and the ecological characterization of NAVSTA Mayport. The NAVSTA Mayport GIR includes a summary of published information including geography, physiography, demographics, climate, regional geology, and hydrogeology; methods and procedures used to conduct the field activities; methodology used to validate analytical data and conduct risk assessments; and characterization of station-wide background conditions, including surface and subsurface soil, surface water, sediment, and groundwater that will be used to evaluate the data from each RFA SV SWMU. The information contained in the GIR (ABB-ES, 1995b) is common to all of the NAVSTA Mayport SWMUs, and it will not be repeated in this confirmatory sampling workplan.

1.2 GROUP IV SWMU AND AOC INVESTIGATIONS. This RFA SV workplan addresses the following Group IV RFA SV SWMUs:

- SWMU 47, Oily Waste Collection System;
- SWMU 53, Sewer Pipelines;
- SWMU 54, Oil-Water Separators;
- SWMU 55, Storm Sewer and Drainage System;
- AOC A, Fuel Distribution System; and
- AOC B, Underground Product Storage Tanks.

The purpose of RFA SV sampling activities is to confirm whether or not contaminant releases have occurred. Releases of contaminants to the environment are suspected but not confirmed at SWMUs 47, 53, and 55. Releases of petroleum-related contaminants have been confirmed at AOC B. No RFA SV sampling activities are proposed for SWMU 54 and AOCs A and B because the underground storage tanks and fuel distribution pipelines included in SWMU 54 and AOCs A and B are being managed in accordance with Chapter 62-761, FAC (Underground Storage Tank Systems) and assessed and remediated, if necessary, under Chapter 62-770, FAC (State Underground Petroleum Environmental Response) regulations on petroleum contamination, and the Florida Department of Environmental Protection (FDEP) is providing oversight. Correspondence regarding SWMU 54 and AOCs A and B is included as Appendix A. Brief descriptions of all SWMUs and AOCs listed above are included in this RFA SV workplan because they are listed in the HWSA permit as requiring confirmatory sampling or assessment.

This RFA SV workplan is intended to serve as a supplemental document to the NAVSTA Mayport RFI workplan (ABB-ES, 1991) and is consistent with the approved Quality Assurance Program Plan (QAPP) and Health and Safety Plan (HASP). Applicable sections of the RFI workplan have been referenced in this RFA SV workplan where appropriate. The RFA SV activities will include testing, assessment, and the collection of soil, groundwater, and sediment samples from SWMUs 47, 53, and 55.

Analytical results of environmental samples will be used to assess whether contaminants are present or potentially have been released from SWMUs 47, 53, and 55. The analytical data also will be used to conduct a preliminary risk screening of SWMUs 47, 53, and 55. The preliminary risk screening will include comparison of the analytical data to relevant background samples and regulatory criteria. Based on the preliminary risk screening, recommendations will be made for additional sampling or conducting an RFI, if necessary, or no further investigation.

In this workplan,Chapter 2.0 presents SWMU and AOC descriptions, background, location, and planned investigation. Chapter 3.0 presents the analytical program, which includes a discussion of analytes of interest, quality assurance and quality cntrol (QA/QC), and analytical methods. Chapter 4.0 presents the human health risk assessment methodology to be used in determining which sites will undergo further investigation and which sites will be recommended for no further investigation. Chapter 5.0 presents QA/QC for all aspects of the field program with the exception of the analytical program. Chapter 6.0 presents health and safety requirements for the work outlined in this workplan. Chapter 7.0 presents the schedule of the work outlined in this workplan.

2.0 BACKGROUND, FIELD INVESTIGATION, AND SAMPLING PROGRAM

The following sections summarize known background information for each Group IV SWMU and AOC and include site characteristics, past activities, and suspected contaminant release scenarios (e.g., types of contaminants, quantities, and affected media). Most of this information is obtained from a VSI conducted during the RFA by A.T. Kearney, Inc., in 1989.

In addition to site background, this chapter describes the field sampling activities and standard operating procedures to be conducted for the RFA SV investigations at Group IV. Chapter 2.0, Site Management Plan (SMP), of the RFI workplan, Volume II (ABB-ES, 1991), provides general operating guidelines for site access, security, and field team organization and logistics that will be implemented during RFI activities. The general requirements and procedures described in the SMP will also be followed for the RFA SV activities outlined in this workplan. Section 3.1, General Site Operations, of the RFI workplan, Volume II, provides descriptions of field personnel responsibilities, sample identification, sample management, chain of custody, project documentation, field changes, corrective actions, decontamination procedures, investigation-derived waste management, and other general project standards and procedures. These requirements will also be followed during the RFA SV activities.

Field and laboratory QA/QC requirements for the RFA SV will comply with the RFI QAPP located in Appendix A of the RFI workplan, Volume II. Health and safety requirements will be in accordance with the general HASP located in Volume III of the RFI workplan and the site-specific HASP located in Appendix F of this RFA SV workplan.

The environmental samples will be compared to appropriate background samples described in the Technical Memorandum, Background Characterization Activities, report for NAVSTA Mayport (ABB-ES, 1994) and NAVSTA Mayport GIR (ABB-ES, 1995b). The objectives of the data-gathering activities at the RFA SV SWMUs are to generate sufficient data from environmental samples to assess the presence or absence of contamination at the site and to conduct preliminary risk screening. The RFA SV sampling and analytical objectives (confirmatory sampling) do not include characterization of the horizontal and vertical extent of contaminants; if contaminants are present, however, site characterization may be required.

2.1 SOLID WASTE MANAGEMENT UNIT (SWMU) 47, OILY WASTE COLLECTION SYSTEM (OWCS).

The oily waste collection system is a system of gravity pipelines, lift stations, and force mains that convey oily bilge water collected from ships at the piers and oily water from operations at the Firefighting Training Center (FFTC) to the oily waste treatment plant (OWTP). A majority of the system was constructed during 1978 to 1980 from ductile iron pipe that is not cathodically protected. Piping at Alpha Pier was replaced in 1991, and Foxtrot Pier was constructed in 1994. The collection system can be broken into two subsystems: the gravity feed system used to convey the oily wastewater (primarily bilge water) from the oily waste risers at the piers to the lift stations, and the lift stations with force main pipelines that convey oily wastes to the OWTP (SWMU 9).

According to the RFA in 1989, the OWCS consists of sewer lines that run parallel to the piers along the Mayport Turning Basin. These sewer lines are the gravity part of the OWCS. The risers that feed the gravity section are located approximately every 50 feet along the length of the entire pier system. The pier system consists of 6 piers designated as the Alpha, Bravo, Charlie, Delta, Echo, and Foxtrot piers as shown on Figure 2-1. The gravity sections of the OWCS feed four lift stations. These lift stations pump the oily waste to the OWTP (SWMU 9) through force mains. The locations of the gravity lines and the force mains are also shown on Figure 2-1.

According to a 1992 evaluation of the OWCS (Hendon, 1992), there are approximately 47 risers around the Mayport Turning Basin that feed the approximately 13,702 linear feet of 6- and 8-inch gravity pipeline. The gravity sewer lines flow to four lift stations that pump the oily waste through approximately 9,960 linear feet of 6-, 8-, and 12-inch diameter force mains. These sewer lines are all believed to be above the water table, and in general, are approximately 6 feet below land surface (bls).

During interviews with NAVSTA Mayport staff civil engineering personnel, it was noted that in January 1990 the diesel fuel marine (DFM) distribution line was broken during an excavation to repair an adjacent utility line. The base personnel investigating the broken line noted what appeared to be old oily waste product in the excavation area, indicating a previous product release. As a result of this discovery, integrity testing was conducted on the oily waste and fuel pipelines. Because this part of the oily waste pipeline is a gravity system, a dye test was conducted; results did not suggest that the oily waste line was leaking. The testing of the DFM pipeline system for this incident and subsequent periodic pressure testing suggest that no apparent leaks are present.

Prior to 1987, the FFTC effluent discharged directly to the Wastewater Treatment Facility (WWTF). In 1987, the oily wastewater sewer line from the FFTC was connected to the oily waste collection system at Echo Pier to pretreat the oily wastewater prior to discharge to the NAVSTA Mayport WWTF.

Investigation of SWMU 47 was recommended in the RFA (A.T. Kearny, 1989) because of the highly permeable soil, the shallow water table, the proximity of the OWCS to surface water, the age of the system, the lack of testing, and the history of failures. It was suggested that the structural integrity of both the gravity and force main pipeline be tested and, if the integrity of the system has been impaired, that repairs be implemented and the soil adjacent to the repair be sampled to determine whether releases of hazardous compounds have occurred. Further, the RFA report recommended that a program for regular inspection and maintenance be implemented by the facility to prevent and/or detect future potential releases of oily waste.

2.1.1 Exploration Program Summary There is no record of the OWCS being completely inspected since its installation. The assessment at SWMU 47, therefore, is intended to thoroughly inspect all the gravity sewer lines and force main sewer lines in the OWCS. This inspection will consist of a video camera inspection of all gravity pipelines and a tracer gas leak test of soil in the vicinity of the pipeline using gas sampling methods at regular intervals (approximately every 20 feet) along the force main sewer line. Each of the risers at the piers, where ships connect to the system, will be visually inspected for signs of damage, spills, and leaks. In addition, each of the lift

stations, which consist of a concrete vault in the ground, will be visually inspected for signs of damage and leakage. At each location where the video or tracer gas results suggest a breach in the line, soil screening data will be collected by direct push technology (DPT) sampling or equivalent technology to evaluate whether oily waste has been released to the surrounding soil. A detailed discussion of two DPT systems is found in Appendix B.

2.1.2 Sampling and Analysis Plan The paragraphs below outline more specifically field tasks to be performed to assess the integrity of the OWCS. Chemical analytes to be tested, and the analytical methods to be used are specified here. Details on the analytical program are located in Chapter 3.0.

2.1.2.1 **Visual Inspection** As noted above, each of the oily waste risers at the piers, where ships are connected to the system, will be visually inspected for signs of damage, spills, and leaks. Similarly, each of the lift stations will also be visually inspected for signs of damage and leakage.

There are 47 oily waste risers on the Alpha, Bravo, Charlie, Delta, Echo, and Foxtrot piers along Mayport Turning Basin, one approximately every 50 feet. Each riser is housed in a low, concrete pillbox (approximately 5 feet long by 3 feet wide) secured by a locked steel door. The door can be opened to reveal the riser, which is either a 6- or 8-inch diameter flanged pipe, onto which ships berthed at the pier attach transfer lines. The visual inspection of the risers will consist of the following.

- Each riser will be identified by its established unique identification code (e.g. "Riser A-1-1," denoting the first riser at Alpha Pier, proceeding sequentially in a clockwise direction).

- Detailed location notes, with sketch map and distance measurements, will be prepared and entered into the field logbook.

- The riser will be photographed.

- Any observations that may indicate leakage or the potential for leakage, such as a cracked pipe, dysfunctional fitting, cracked pavement, oil staining in or around the riser, or odor in surrounding soil, will be noted in the logbook.

- A standard format will be used to enter the collected data in the field logbook for each riser.

There are four lift stations where the gravity lines that connect each riser join the force main pipeline. The lift stations consist of a below-ground concrete vault that fills with oily waste from the gravity lines. The vault is equipped with a pump. When the lift station sump fills to a specific level, the pump is activated, pumping the oily waste into the force main. Access to the lift station is through a manhole. The visual inspection of the lift stations will consist of the following:

- Each lift station will be identified by its established unique identification code.

- Detailed location notes will be prepared, with sketch map and distance measurements to close permanent landmarks, and noted in the field logbook.

- The lift station will be photographed.

- Any observations that may indicate leakage, or the potential for leakage or overflow, at the lift station, such as cracked walls, cracked or broken inlet or outlet pipes, oil staining around the lift station, or odor from the surrounding soil, will be noted in the logbook.

- A standard format (the same form as for the risers) will be used to record data collected for each lift station with any photographs taken.

2.1.2.2 **Video Camera Inspection** To minimize the disruption of the operation of the OWCS, the gravity sewer between the risers and the lift stations will be inspected with a remote-controlled video camera. The force mains will not be investigated using this technique because they would have to be taken out of service for the duration of the inspection. The video inspection of the gravity sewers will be completed as follows:

- Access to each segment of line can be made at either the risers or at the lift stations. The camera will be placed in the line, and it will propel itself through the line, trailing behind it the video signal line and the controller line.

- An operator experienced in the control vehicle will observe and record on VHS videotape the video image returning from the camera as it travels down the line. The operator will note in a log (electronic and hard copy) the distance (measured by the system from the starting point) and description of any defects observed in the pipeline.

- Each defect will be designated with a unique identification code.

- Observable defects will include, but may not be limited to, cracks, ruptures, and collapses.

- For each segment of line inspected, all activities will be documented in a field logbook, including, but not limited, to the date, time, starting point (riser or lift station identification), and significant observations, events, standby time, equipment problems, etc.

After the video camera inspection, a survey crew capable of underground utility surveys will be contracted to mark on the ground surface each location where a defect was observed. If the defect runs the length of the pipeline for more than 20 feet, a mark will be placed every 20 feet along the defect. The survey crew will use available utility maps as a first step to marking the location of the lines. Appropriate electronic sensing instruments will be used to confirm the utilities maps and positively identify the location of the lines. Appropriate instrumentation may include ground-penetrating radar (GPR) or instruments employing the principle of electromagnetic induction, such as metal detectors. Using the report provided by the video inspection, which will indicate the linear distance from the starting point to each defect, the surveyor will mark on the ground surface the location of the defect. Each mark will consist of a semi-permanent monument, such as a metal survey spike driven flush with the surface

(unpaved ground, asphalt, or concrete), and labeled with a metal tag that indicates the defect identification code.

2.1.2.3 **Tracer Gas Leak Test and Soil Gas Sampling Inspection** The force main between lift stations and the OWTP will be inspected by a tracer gas leak test with associated soil gas sampling. The leak testing will be performed at a time when use of the OWCS is not required by ships at the station. However, the system does not need to be taken out of service for the inspection to be performed. The leak testing will be performed as follows.

- Using available utility maps and/or appropriate electronic sensing instruments such as GPR or instruments employing the principle of electromagnetic induction, such as metal detectors, a survey crew will precisely locate and temporarily mark the path(s) of the force main lines.

- The soil gas test crew will use hand tools or DPT such as a truck- or van-mounted Geoprobe™ to install permanent soil gas monitoring points at an interval of 20 feet immediately adjacent to the line between each lift station and the point of contact with the OWTP. Approximately 480 points will be installed. These points can be placed in locations that are unpaved, paved with asphalt, or paved with concrete. Each monitoring point will consist of 1-inch inside-diameter (ID) steel or polyvinyl chloride (PVC) pipe with a 5-foot long 0.010-inch slotted screen at the bottom. Each point will be installed in a hole, using DPT, to a depth such that the screened interval spans the depth at which the force main is placed, which in general is expected to be approximately 6 feet bls. Therefore, if the line is actually at 6 feet bls, the bottom of the monitoring point would be placed 2.5 feet below it, at a depth of 8.5 feet bls. In some cases the bottom of the point may be below the water table, which is acceptable. However, part of the screened interval must be above the water table to permit retrieval of soil gas samples. The installation requires no engineered filter pack or seal material like that required in a groundwater monitoring well installation. Each monitoring point will be constructed with a secure surface completion consisting of a small concrete pad and protective well cap such that the top of the point is flush with the ground surface. The points will be permanently installed so that the facility has them available for future leak testing, as recommended in the 1989 RFA (A.T. Kearney, 1989).

- After the monitoring points are installed, a small amount of a volatile organic tracer gas will be added to the contents of the pipeline. The tracer gas will be selected, with Navy approval, to be compatible with the pipeline and surrounding soil, and absent from the environment around the pipeline. The tracer gas will be added as a mixture of tracer gas and ambient air, and injected into the pipeline system under pressure.

- The injection pressure will be maintained until the tracer gas is detected in air samples taken from a sampling port at the opposite end of the pipeline segment being tested. Analysis will be performed in the field using a truck- or van-mounted Hewlett-Packard 5890 or similar gas chromatograph (GC) fitted with a flame-ionization detector (FID) and electron-capture detector (ECD).

- Once the tracer gas is detected at the end of the force main, the pressure will be maintained in the system up to a period of 24 hours to allow the tracer gas to be forced through any breaches in the line and into the surrounding soil void space.

- After the tracer gas injection is stopped, soil gas samples will be collected from the monitoring points and analyzed using the field GC for the tracer compound.

Additional information on the tracer gas investigation is contained in Appendix C.

2.1.2.4 **Environmental Sampling** At each location where the video inspection or tracer gas investigation identifies a defect in the oily waste collection system, an exploration with the site characterization and analysis penetrometer system (SCAPS) or other DPT will be completed. SCAPS is a real-time detector of hydrocarbons in subsurface soil. The hydrocarbons are detected by their fluorescent response to excitation by ultraviolet light. The measurement is made by projecting a nitrogen laser light beam through a 365-micron optical fiber in the center of the penetrometer rod. The optical fiber terminates at a sapphire window that emits the laser light into the surrounding soil. A signal is collected by another optical fiber and transmitted to a photodiode array. The data are recorded in real time via a computer and quantified against a standard curve to provide a response measurement. The response is directly related to the concentration of the hydrocarbons in the soil. In addition to the hydrocarbon sensor, the penetrometer tip also contains sensors that provide the user with a continuous lithologic log of the exploration.

Based on the results of the sewer pipeline video inspection conducted in 1988 (Smith and Gillespie, 1988), it is estimated that a defect will be investigated approximately every 50 feet along the length of the oily waste pipeline. An estimated 24,000 linear feet of oily waste pipeline will be investigated during this RFA. If an exploration is attempted every 50 feet, a total of 480 locations will be assessed.

2.2 **SWMU 53, SEWER PIPELINES**. The RFA describes the sewer pipelines as the system that collects and transports wastewater from all areas of the station to the NAVSTA Mayport Wastewater Treatment Facility (WWTF)(A.T. Kearny, 1989). The WWTF is an National Pollutant Discharge Elimination System (NPDES) permitted facility located to the south of the entrance to the Mayport Turning Basin (Figure 2-2). Like the OWCS (SWMU 47), the sewer lines are composed of gravity feed pipelines, lift stations, and force main sewer lines. Table 2-1 lists the length of sewer pipeline by diameter and type (gravity or force) for all of NAVSTA Mayport.

The RFA states that the sewer pipeline transports industrial wastewater to the WWTF in addition to the domestic sewage (A.T. Kearny, 1989). The industrial operations that contribute wastewater flow to the WWTF include Shore Intermediate Maintenance Activity (SIMA), Aircraft Intermediate Maintenance Depot (AIMD), helicopter maintenance hangars, commercial shipyards, and the ships berthed in the Mayport Turning Basin. The RFA also states that each part of the system was

Table 2-1
Sewer Pipeline Lengths by Type

RFA/SV Workplan, Group IV
U.S. Naval Station
Mayport, Florida

Pipe Diameter (inches)	Gravity Sewer Line (linear feet)	Force Main (linear feet)	Total (linear feet)
3	0	675	675
4	0	4,540	4,540
6	0	5,545	5,545
8	46,510	5,819	52,329
10	5,747	1,421	7,168
12	548	2,531	3,079
15	2,684	0	2,684
18	231	3,829	4,060
21	2,171	0	2,171
24	2,412	0	2,412
Total	60,303	24,360	84,663

likely constructed when the associated buildings were constructed, beginning in 1942. Therefore, much of the system was probably constructed in the 1950s when the station was expanded to accommodate more and larger vessels.

The RFA states that wastes that could possibly be discharged through floor drains and sinks by these industrial activities include paint wastes, cleaning compounds, degreasers, foundry cleaning liquids, water from oil-water separators, and effluent from a ship's combined holding tanks (A.T. Kearny, 1989). A WWTF influent sampling study conducted by the USEPA in 1987 identified many hazardous constituents in the influent to the WWTF. Those constituents included chromium, nickel, chloroform, toluene, naphthalene, methyl ethyl ketone, benzene, 1,4-dichlorobenzene, bromoform, and phenols (A.T. Kearny, 1989).

Investigation of SWMU 53 was recommended in the RFA because of the high permeability of the soil at NAVSTA Mayport, the shallow water table, the proximity to surface water, and the potential for release of material to the soil, groundwater, and surface water (A.T. Kearny, 1989). Because some of the sewer lines originate in an industrial setting, it was recommended in the RFA that the sewer pipelines be investigated. It was further suggested that the maintenance and repair procedures for the pipeline be evaluated to determine if they are adequate to ensure that releases from the system are prevented.

In 1988, an evaluation using a remote video camera to view the sewer system was completed by Smith and Gillespie Engineers, and a large number of recommended repairs were identified. Many of the repairs recommended by the inspection were completed. This limits the area to be investigated to the sewers from helicopter maintenance, SIMA, and the sewers along Moale Avenue north of the golf course.

The RFA (A.T. Kearney, 1989) recommended that the structural integrity of the sewer system be evaluated, and, if the structural integrity has been impaired, that appropriate repairs be implemented and soil sampling conducted to determine whether releases of hazardous compounds have occurred. Further, the RFA report recommended that a program for regular inspection and maintenance be implemented by the facility to prevent and/or detect future releases from the sewer system (A.T. Kearny, 1989).

2.2.1 Exploration Program Summary The RFA SV at SWMU 53 will inspect lines in the sewer system that transport wastewater from the industrial part of the facility. There are approximately 14,000 linear feet of force main and 3,000 linear feet of gravity sewer line in the industrial areas. The sewer lines that service only the residential areas of the facility are not expected to contain hazardous constituents; therefore, they will not be included in the RFA SV field program.

Because some records of repairs to sewers in the industrial areas were kept after the 1988 video inspection, a similar video camera inspection of the entire gravity sewer system will not be performed. Approximately 3,000 linear feet of gravity sewer and 2,000 linear feet of force main will be inspected. At each location where the video inspection suggests a break in the line, soil screening data will be collected by DPT (e.g., Terraprobe℠) sampling to evaluate whether hazardous constituents have been released from the sewer line into the surrounding soil and groundwater. The tracer gas methodology used to investigate the oily waste force main will also be used to investigate the sewer force main.

2.2.2 Sampling and Analytical Program The paragraphs below outline the tasks to be performed to assess the integrity of the WWTP sewer system. Chemical analytes to be tested and the analytical methods to be used are also specified here. Details on the analytical program are presented in Chapter 3.0.

2.2.2.1 **Video Camera Inspection** The gravity sewer lines will be inspected with a remote-controlled video camera in the same manner as described for SWMU 47.

- The camera will be placed in the sewer, and it will propel itself through the sewer, trailing behind it the video signal line and the controller line.

- An operator experienced in video control of the vehicle will observe and record on VHS videotape the image returning from the camera as it travels down the line. The operator will note on a log form (electronic and hard copy) the distance (measured by the system from the starting point) and description of any observable defects in the pipeline.

- Each defect will be provided a unique identification code.

- Observable defects will include, but may not be limited to cracks, ruptures, and collapses.

- For each segment of line inspected, all activities will be documented in a field logbook, including, but not limited to the date, time, starting point (manhole or lift station identification), significant observations, events, standby time, equipment problems, etc.

After the video camera inspection, a survey crew capable of underground utility surveys will be contracted to mark on the ground surface each location where a defect was observed. The survey crew will use available utility maps as a first step in identifying the line location. Appropriate electronic sensing instruments will be used to confirm the utility maps and positively identify the location of the lines. Appropriate instrumentation may include GPR or instruments employing the principle of electromagnetic induction, such as metal detectors. Using the report provided by the video inspection, which will indicate the linear distance from the starting point to each defect, the surveyor will mark on the ground surface the location of the defect. Each mark will consist of a semipermanent monument, such as a metal survey spike driven flush with the surface (unpaved ground, asphalt, or concrete), and labeled with a metal tag that indicates the defect identification code.

2.2.2.2 **Tracer Gas Leak Test and Soil Gas Sampling Inspection** The force mains that transport wastewater from the lift stations in industrial areas to the WWTF will be inspected by a tracer gas leak test and associated soil gas sampling. The leak testing will be performed at a time when use of the sewer system is minimal. The system, however, does not need to be taken out of service for the inspection to be performed. The leak testing will be performed as follows:

- Using available utilities, maps, and/or appropriate electronic sensing instruments such as GPR or instruments employing the principle of electromagnetic induction, such as metal detectors, a survey crew will precisely locate and temporarily mark the paths of the force main lines.

- The tracer test crew will use hand tools or DPT such as a truck- or van-mounted Geoprobe™ to install temporary soil gas monitoring points at an interval of 20 feet immediately adjacent to the line between each lift station and the point of contact with the WWTF. Approximately 100 points are estimated to be installed. These points can be placed in locations that are unpaved, paved with asphalt, or paved with concrete. Each monitoring point will consist of 1-inch ID steel or PVC pipe with a 5-foot long 0.010-inch slotted screen at the bottom. Each point will be installed in a hole to a depth such that the screened interval spans the depth at which the force main is placed, which in general is expected to be approximately 6 feet bls. Therefore, if the line is actually at 6 feet bls, the bottom of the monitoring point would be placed 2.5 feet below it, at a depth of 8.5 feet bls. In some cases, the bottom of the point may be [illegible] water table, which is acceptable; however, part of the screened interval must be above the water table to permit collection of soil gas samples. The installation requires no engineered filter pack or seal material like that required in a groundwater monitoring well installation. The points can be installed permanently or temporarily, so that the facility has the option of future leak detection testing, as recommended in the 1989 RFA (A.T. Kearney, 1989). If the Navy decides that the sampling point will be permanently installed, each monitoring point will be constructed with a secure surface completion consisting of a small concrete pad and protective well cap such that the top of the point is flush with the ground surface. If the points are to be temporarily installed, no surface completion will be required.

- After the monitoring points are installed, a small amount of a volatile organic tracer gas will be added to the contents of the pipeline. The tracer gas will be selected with Navy approval to be compatible with the sewer line and surrounding soil and absent from the environment around the sewer line. The tracer gas will be added as a mixture of tracer gas and ambient air, and injected into the sewer line under pressure.

- The injection pressure will be maintained until the tracer gas is detected in air samples taken from a sampling point at the far end of the force main. Analysis will be performed in the field using a truck- or van-mounted Hewlett-Packard 5890 (or similar) GC fitted with an FID and ECD.

- Once the tracer gas is detected at the end of the force main, the pressure will be maintained in the system, up to a period of 24 hours, to allow the tracer gas to be forced through any breaches in the line and into the surrounding soil void space.

- After the tracer gas injection is stopped, the soil gas will be sampled from the monitoring points and analyzed for the tracer compound.

Additional information on the tracer gas investigation is contained in Appendix C.

2.2.2.3 **Environmental Sampling** At each location where the video inspection or tracer gas investigation identifies a defect in the sewer line, environmental soil and groundwater samples will be collected by DPT to assess whether hazardous constituents have been released to the surrounding soil and groundwater. Based on the 1988 evaluation of the sewer system, it is estimated that there may be a

significant defect approximately every 50 feet. With a total of 5,000 linear feet of sewer line being investigated, it is estimated that 100 locations may be assessed. Samples will only be collected at locations where defects are identified. Each sample point will be placed as close to the sewer line as is considered safe given the estimate of precision for its surveyed location. Sample points should be placed within 4 feet of the surveyed location of the sewer line. The soil and groundwater sampling procedures will be those outlined in Appendix D of this workplan, with some modifications to account for the DPT sampling technique.

A soil sample will be collected at ground surface (0 to 1 foot bls) and at the depth of the sewer line (between 3 and 10 feet bls). The depth of the subsurface soil sample collected at a depth similar to the sewer line will be determined by measuring the depth of the pipe line at junction boxes between the line segment being tested. If the area to be sampled is covered by asphalt or concrete, the soil immediately beneath the asphalt or concrete will be sampled. The surfical sample will help distinguish between any past surfical contamination that has migrated down and any subsurface contamination that should be attributed to breaks in the sewer line.

A groundwater sample will also be collected from each exploration to determine if the groundwater has been affected. Using the knowledge of groundwater flow direction gathered during previous investigations, the exploration points will be placed hydraulically downgradient from the defect in the sewer line to increase the probability that any release will be detected. Using the DPT tools, groundwater samples can be acquired in three ways. The preferred groundwater sampling technique uses either a customized probe with a self-contained filter pack to minimize the turbidity of the samples or, if that is unavailable, a probe with a slotted screen can be used. This latter probe is similar in design to an aquapunch used on full-sized drill rigs. The third option is to use a conventional probe tip and use the peristaltic pump at an extremely low flow rate to minimize the turbidity.

The Terraprobe℠ sampling system consists of a truck or van equipped with a combination hydraulic ram and hydraulic hammer. The ram and hammer use the weight of the vehicle to press and hammer a threaded, 1-inch diameter, hollow steel rod string fitted with an interchangeable, 24-inch long stainless-steel sampling tube. To drive to the sample depth, the sample tube is sealed with a cone tip. At the sample depth, the cone tip is retracted, and the rod string driven 24 inches to fill the sample tube. Upon retrieval of the string, the soil sample can be extruded from the sample tube into precleaned glass sampling jars using a hydraulic piston. Because of their narrow diameter, Terraprobe℠ borings are self-healing and do not require grouting upon completion. No investigation-derived waste other than decontamination rinsate is generated.

The groundwater sampling procedure is a modification of previous sampling methods; however, it closely resembles a method proposed by USEPA (1994). Prior to groundwater sample collection, the temporary sampling point will be pumped using a peristaltic pump to minimize turbidity from the groundwater by pumping slowly enough to not cause the suspension of silt and clay in the sample. Turbidity, temperature, pH, and conductivity will be measured during pumping to ensure good conductance between the temporary sampling point and the surrounding aquifer matrix. The temporary sampling point will be pumped until temperature, conductivity, and pH have stabilized. Pumping will continue until the turbidity

is below 5 nephelometric turbidity units (NTUs) or until the field operation leader believes further pumping will not significantly decrease the turbidity. A filtered sample will be collected at each exploration that has turbidity greater than 5 NTU.

All groundwater samples will be collected using a peristaltic pump and disposable Teflon™ tubing. The samples will be collected before the material comes in contact with the pump. Volatile organic compounds (VOCs) will be collected last for samples submitted for laboratory analyses. The sampler will try to prevent agitation of the water in the temporary sampling point, and the groundwater samples will be carefully transferred to a VOC vial for shipment to the laboratory. Sample locations will be chosen to ensure that the exploration will be downgradient of any defect in the underground pipeline.

The soil and groundwater samples will be analyzed for VOCs in an onsite laboratory using a field GC. VOCs are used to screen samples because the presence of inorganic contaminants is not expected without the presence of volatile organic contaminants. Approximately 20 percent of the soil and groundwater samples collected will be split or duplicated and submitted to an offsite laboratory for the following analyses:

- SW-846 Method 8240 for VOCs and
- SW-846 Methods 6010, 7470, 7480, and 9010 for metals and cyanide.

2.3 SWMU 54, OIL/WATER SEPARATORS. There are 12 active oil-water separators at NAVSTA Mayport (Table 2-2). These oil-water separators are used to separate oils from wastewater prior to discharge to the WWTF. The oil-water separators at NAVSTA Mayport are completely underground with manhole access and have associated underground storage tanks that receive and accumulate the oily fraction. The water fraction is discharged to the sanitary sewer pipelines (SWMU 53) for treatment in the wastewater treatment plant (Figure 2-3).

The RFA report identified that the oil-water separators had been cleaned out in the fall of 1988 (A.T. Kearny), and facility personnel stated that there was no ongoing maintenance program for the oil-water separators at the station. Facility personnel also reported problem back-ups with the oil-water separators at the SIMA building and that when the 1,000-gallon oil storage tank at SIMA was pumped out in 1988, 3,000 gallons of oil were removed. The source of the excess oil was never determined. Facility personnel also suspected the oil-water separators at the SIMA facility were responsible for the high volume of oil and grease inputs to the WWTF. Currently these tanks are pumped-out quarterly and the separators are maintained by the Base Operating Support and Services contractor. The maintenance primarily consists of visual inspection and the removal of debris.

Investigation of SWMU 54 was recommended because of the highly permeable soil at NAVSTA Mayport, the shallow water table, the underground location of the separators, and the potential for release of material to the soil and groundwater (A.T. Kearny, 1989). Furthermore, the 1989 RFA recommended that due to the location of the oil-water separators, coupled with the lack of historical maintenance, repair, and clean-out activities, they warranted further investigation.

Table 2-2
Active Oil-Water Separators

RFA SV Workplan, Group IV
U.S. Naval Station
Mayport, Florida

Facility Number	Location	Building Number	Capacity of Associated Tank (Gallons)	Number of Separators Attached to Tank
1515	Hobby Shop	414	1,000	1
1490	SIMA	1,488	1,000	3
1461	Transportation	25	4,000	1
1342	Helicopter Maintenance Hangar	1,330	550	1
1863	CB Complex	1,613	500	1
1417	Helicopter Maintenance Hangar	1,343	1,000	1
1864	Aircraft Intermediate Maintenance	1,553	270	1
1865	Aircraft Maintenance Hangar	1,552	150	1
1866	Operational Training Center	1,555	500	1
1512	Engine Power Check Stand	1,609	1,000	1

Notes: SIMA = Shore Intermediate Maintenance Activity.
CB = Construction Battalion.

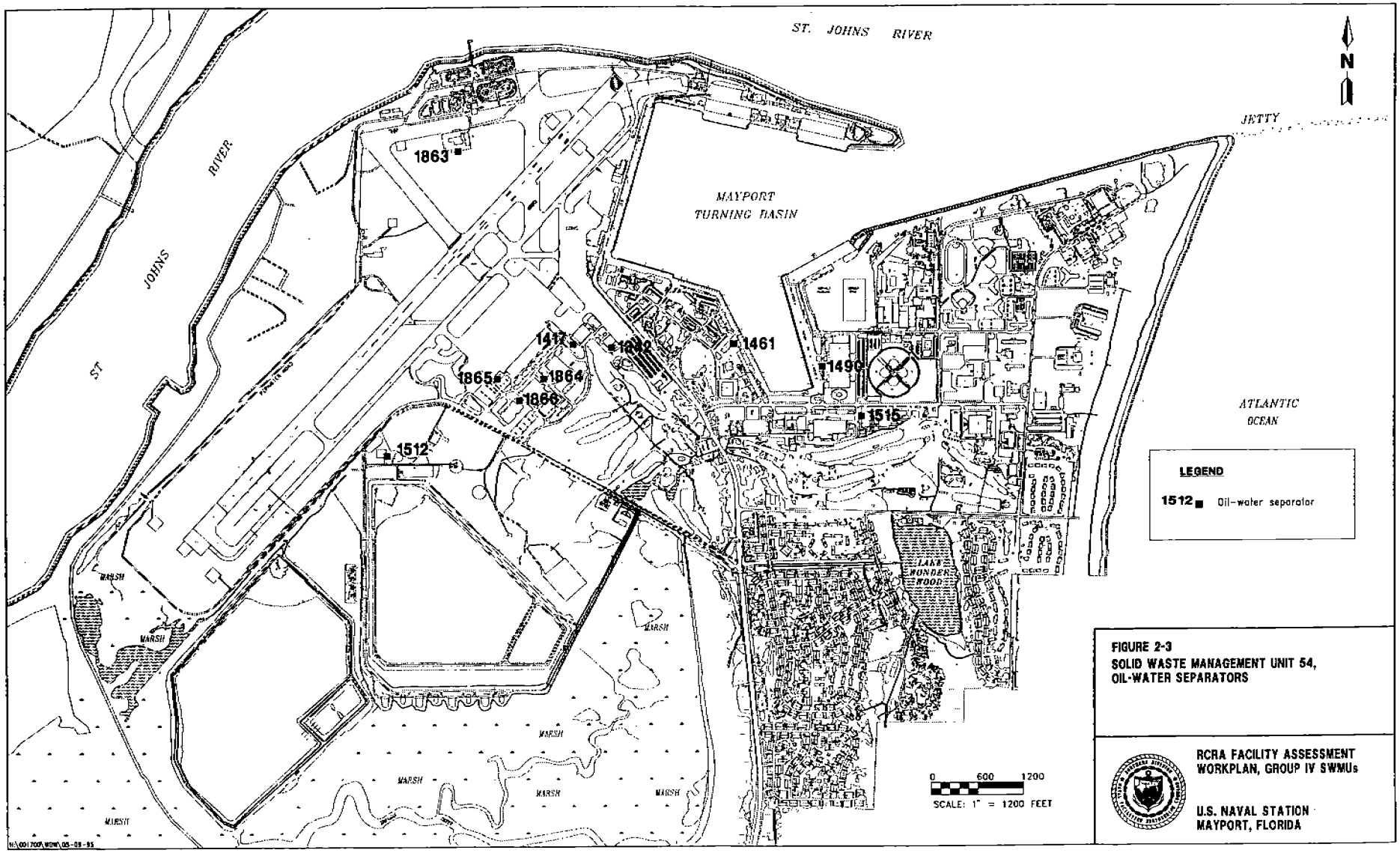

FIGURE 2-3
SOLID WASTE MANAGEMENT UNIT 54,
OIL-WATER SEPARATORS

RCRA FACILITY ASSESSMENT
WORKPLAN, GROUP IV SWMUs

U.S. NAVAL STATION
MAYPORT, FLORIDA

Currently, the underground storage tanks associated with the oil-water separators are being replaced, and any release will be assessed at that time. Under the existing schedule all of the tanks associated with the oil-water separators will be replaced by August 1995. No RFA/SV sampling activities are proposed for SWMU 54, because SWMU 54 is being managed under Chapter 62-761, FAC, and any releases from the tanks or separators are assessed under Chapter 62-770, FAC, regulations on petroleum contamination, with FDEP oversight. The State of Florida underground storage tank regulations are similar to or more stringent than the Federal underground storage tank regulations found in the CFR, Title 40, Part 280, Technical Standards and Corrective Action Requirements for Owner Operators of Underground Storage Tank Programs, which was revised and published on September 23, 1988, and became effective December 22, 1988. A letter from the Navy explaining the expected actions to be taken with the tanks associated with the oil-water separators is included in Appendix A.

Because SWMU 54 is being managed under Chapter 62-761, FAC, and oversight of assessment and remedial activities is being provided by FDEP, it is recommended that SWMU 54 be transferred to the State of Florida's underground storage tank management and petroleum site cleanup program (Chapters 62-761 and 62-770, FAC). Correspondence agreeing to this approach is included in Appendix A.

2.4 SWMU 55, STORM SEWER AND DRAINAGE SYSTEM. The RFA report describes the storm sewer system at NAVSTA Mayport as consisting of underground storm sewer pipes and unlined drainage ditches (A.T. Kearny, 1989). The storm sewer system conveys run-off to the St. Johns River, Sherman Creek, Lake Wonderwood, the Mayport Turning Basin, and the Atlantic Ocean (Figure 2-4). Many of the storm sewer pipes that discharge to the surrounding surface water are fed by unlined drainage ditches found over the entire facility.

The RFA report states that the flight line retention ponds (SWMU 49), the boiler blowdown at Building 250, and the Hobby Shop Drain (SWMU 20) discharge into the stormwater drainage system. Both the flight line retention ponds and the hobby shop drain have been investigated in previous RFA confirmatory sampling efforts. The unlined drainage ditch system that runs throughout the base is a possible recipient of any uncontrolled spills of hazardous material and leaks from underground systems such as the OWCS (SWMU 47) or the oil-water separators (SWMU 54) (A.T. Kearny, 1989). The 1989 RFA report included as an example a report of a long-term intermittent discharge of an oily material from a stormwater outfall in the Alpha pier area thought to be from a fuel-line leak (SWMU 29). This problem was assessed under Chapter 62-770, FAC (State Underground Petroleum Environmental Response), regulations on petroleum contamination with the FDEP providing oversight.

The RFA recommended further investigation of the storm sewer and drainage system due to the highly permeable soil at NAVSTA Mayport, the shallow groundwater table, and the fact that the stormwater discharges directly to surface water. In addition, the drainage system was indicated as possibly containing hazardous constituents discharged to it in the industrial areas of the facility (A.T. Kearny, 1989). The RFA recommended a program of surface water and sediment sampling in the drainage ditches and the discharge points from both the storm sewer pipes and the drainage ditches.

At the time of the RFA no inventory of the storm sewers existed; however, an inventory of the storm sewer system was completed in 1994 as part of the Storm Water Pollution Prevention Plan by Ogden Environmental and Energy Services (Ogden, 1994).

2.4.1 Exploration Program Summary The 1989 RFA (A. T. Kearney, 1989) suggested a program of surface water and sediment sampling in the unlined drainage ditches to identify whether significant levels of contaminants have accumulated in the system. The Group IV RFA/SV sampling focus will be the unlined drainage ditches from the industrial areas of the station (Figure 2-4).

The RFA for SWMU 55, therefore, is intended to investigate whether contaminants are present in the drainage ways as a result of discharges to surface runoff from the industrial area. There are 17 stormwater outfalls that drain the industrial areas of the station; a sediment sample will be collected from the unlined drainage ditch that feeds each of these outfalls. The drainage ditches that drain the helicopter maintenance areas have already been sampled in previous investigations. The data from this sampling will be used for this investigation. All other known industrial areas are drained by the 17 outfalls that will be sampled.

2.4.2 Sampling and Analytical Program For each of the 17 outfalls, at least one surface soil or sediment sample will be collected from the stormwater drainage way. Surface water samples will be collected if standing water is present at the sampling locations. The sampling locations will be determined through visual inspection of the drainage way. The sample will be taken at a low point in the drainage way; e.g., a low spot associated with the start of the concrete conveyance. If, however, the stormwater is collected from concrete or asphalt covered areas only, no surface soil or sediment sample will be collected for that outfall. Most of the concrete conveyance pipelines are used to convey the stormwater under the pier areas and into the Mayport Turning Basin. Surface soil, surface water, and sediment samples will be collected as specified in the RFI workplan (ABB-ES, 1991) and in ABB-ES CLEAN Program Standard Operating Procedure number ND-SWSD-001-00, dated August 3, 1994.

Surface soil, surface water, and sediment samples will be submitted to an offsite laboratory for the following analyses:

- SW-846 Method 8240 for VOCs,
- SW-846 Method 8270 for semivolatile organic compounds (SVOCs), and
- SW-846 methods 6010, 7470, 7480, and 9010 for metals and cyanide.

If contamination is discovered in the surface soil or sediment samples, ecological toxicity testing may be required to assess whether the location will be further investigated under an RFI. If ecological testing is conducted, the results will be evaluated as described in Section 4.0.

2.5 AREA OF CONCERN (AOC) A, FUEL DISTRIBUTION SYSTEM. As described in the 1989 RFA (A.T. Kearny, 1989), fuel is stored at NAVSTA Mayport Fleet and Industrial Supply Center at the Fuel Farm located in the northern part of the station adjacent to the St. Johns River (Figure 2-5). The fuel is supplied to ships via trucks, barges, or fuel lines that make up the Fuel Distribution System (AOC A). Two types of fuel are supplied to the ships at Mayport, DFM

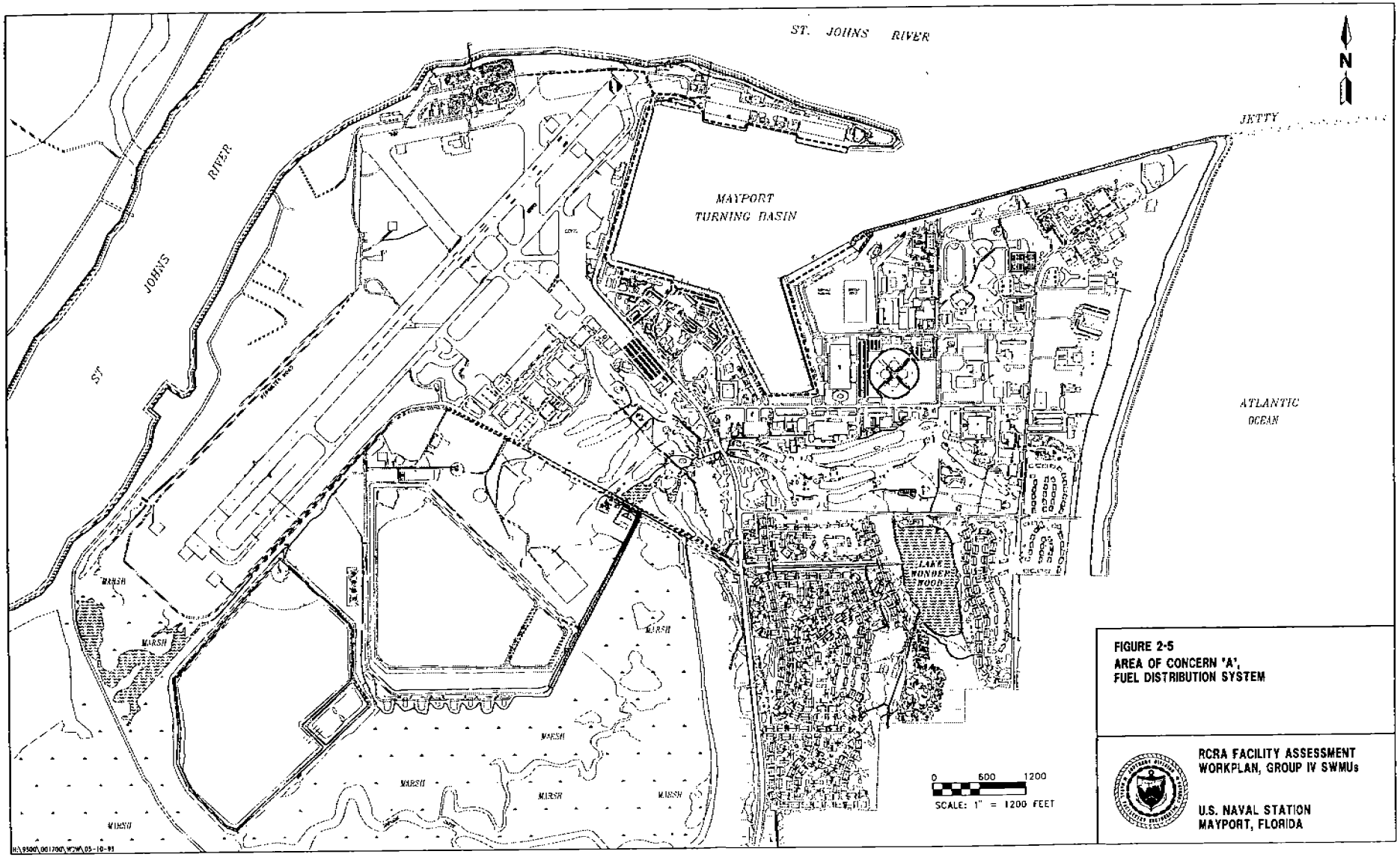

FIGURE 2-5
AREA OF CONCERN 'A',
FUEL DISTRIBUTION SYSTEM

RCRA FACILITY ASSESSMENT
WORKPLAN, GROUP IV SWMUs

U.S. NAVAL STATION
MAYPORT, FLORIDA

and JP-5 aviation fuel. The pipelines, one for each product, originate at the fuel farm and proceed east, parallel to the St. Johns River to the Mayport Turning Basin. The JP-5 fuel pipeline services only Bravo and Charlie piers (the northernmost and northwestern piers) where the aircraft carriers berth. The DFM pipeline services all the piers surrounding the Mayport Turning Basin. Once the fuel is at the piers, it is pumped to the ships via risers in the piers.

The fuel distribution system was installed in approximately 1960, except for the fuel pipelines that service Echo Pier, constructed in 1983, and Foxtrot Pier, constructed in 1994. The fuel pipelines are all constructed of coated steel.

Currently the lines are not cathodically protected; however, there are plans to add cathodic protection to the system by the end of 1995. The only fuel leak known from the system was the rupture of a cast iron valve body near the intersection of Alpha and Delta Piers. Since that incident, the system has been pressure tested (first in March 1988) at least annually by raising the hydraulic pressure in the pipeline to 90 pounds per square inch (psi) and holding it at that pressure for 10 minutes to 1 hour. A review of the logs maintained at the fuel farm showed no significant pressure drop has ever been observed during testing. During the most recent pressure test, August 1994, the system was pressurized to 90 psi and held at that pressure for 30 minutes without a pressure drop.

Because the fuel pipelines are connected to underground petroleum product storage tanks, they are considered "ancillary equipment" to the bulk fuel storage tanks; thus, no RFA/SV sampling activities are proposed for AOC A. The tanks associated with AOC A will be replaced by 1999, and any releases will be assessed at that time. The State of Florida underground storage tank regulations (FAC 62-761) are similar to or more stringent than the Federal underground storage tank regulations found in the CFR, Title 40, Part 280, Technical Standards and Corrective Action Requirements for Owner Operators of Underground Storage Tank Programs), which was revised and published on September 23, 1988, and became effective December 22, 1988.

Because AOC A is being managed under Chapter 17-761, FAC, and oversight of any assessment or remedial activities will be provided by FDEP, it is recommended that AOC A be deleted from the list of sites requiring confirmatory sampling and transferred to the State of Florida's underground storage tank management and petroleum site cleanup program (Chapters 62-761 and 62-770, FAC). copies of correspondence concurring with this approach are included in Appendix A.

2.6 AREA OF CONCERN (AOC) B, UNDERGROUND PRODUCT STORAGE TANKS. The RFA report identified underground petroleum product storage tanks with possible leaks as an AOC (A.T. Kearny, 1989). The RFA report recommended no further action on all but two of the underground storage tank sites. The two exceptions identified for further investigation were based on conversations with base personnel who reported that recent soil borings had encountered petroleum contamination (A.T. Kearny, 1989). In 1991 the two sites, one at Building 25, the NEX Service Station, and the other at Building 265, the Public Works Department, have undergone site characterization and both locations will soon be undergoing site remediation (Rust, 1994; 1995). Selected sections of the remedial action plans (RAPs) for these sites are provided in Appendix A.

Because AOC B is being managed under Chapter 62-761, FAC, and any releases will be assessed under Chapter 62-770, FAC, regulations on petroleum contamination, with FDEP oversight, no RFA SV sampling activities are proposed. The State of Florida underground storage tank regulations are similar to or more stringent than the Federal underground storage tank regulations found in the CFR, Title 40, Part 280 (Technical Standards and Corrective Action Requirements for Owner Operators of Underground Storage Tank Programs), which was revised and published on September 23, 1988, and became effective December 22, 1988.

Because AOC B is being managed and assessed under Chapters 62-761 and 62-770, FAC, and oversight of assessment and remedial activities is being provided by FDEP, it is recommended that upon the next modification of the HSWA permit, AOC B be transferred to the State of Florida's underground storage tank management and petroleum site cleanup program (Chapters 62-761 and 62-770, FAC). Copies of correspondence concurring with this approach are included in Appendix A.

3.0 ANALYTICAL PROGRAM

The analytical program for the Group IV RFA SV at NAVSTA Mayport will address analytes selected from both the 40 CFR 264, Appendix IX, groundwater monitoring list and the USEPA Contract Laboratory Program target compound list (TCL) and target analyte list (TAL). Tables 3-1 through 3-4 provide a summary of target analytes in both lists, current target analytes, and target analytes that have been detected in previous investigations at NAVSTA Mayport. Gas chromatography and mass spectroscopy (GC/MS) methods will be used for analyses of environmental and QA/QC samples. Specifically, USEPA Method 8240 will be used to analyze for VOCs (Table 3-1) and USEPA Method 8270 will be used to analyze for SVOCs (Table 3-2). USEPA Method 8080 will be used to analyze for chlorinated pesticides and PCBs (Table 3-3). Organophosphorus pesticides (USEPA 8140) and chlorinated herbicides (USEPA Method 8150) are target analytes only at sites known to be used for pesticide storage, handling, and mixing. No such sites have been identified at Group IV; therefore, analyses will not be conducted for organophosphorus pesticides or chlorinated herbicides. Selected metals will be analyzed by inductively coupled plasma (ICP), graphite furnace atomic absorption (GFAA), or cold vapor atomic absorption (CVAA), as appropriate (e.g., USEPA Methods 6010, 7420, or 7470) (Table 3-4). USEPA Method 9010 will be used to analyze for cyanide. The data quality objective (DQO) for reporting the analytical results for VOCs, SVOCs, pesticides, polychlorinated biphenyls (PCBs), and inorganics will be Naval Energy and Environmental Support Activity (NEESA) Level C.

The number of field and laboratory QA/QC samples to be collected will be in accordance with the generic QAPP, Appendix A, Volume II, of the NAVSTA Mayport RFI workplan (ABB-ES, 1991). Field and laboratory QA/QC samples will be analyzed by the same analytical methods as the associated environmental samples. The following presents a brief description of field QA/QC samples that will be collected.

- **Duplicates**. Duplicates of soil, groundwater, and sediment samples will be submitted for analyses at a rate of 10 percent of the samples analyzed, or a minimum of one per event for each media sampled.

- **Trip Blanks**. A trip blank will be included in each shipping container with samples scheduled for VOC analyses and will be analyzed with other VOC samples.

- **Equipment Rinsate Blanks**. A minimum of one equipment rinsate (sampler) blank per week per medium will be collected from each piece of equipment used in the sampling event (bailers, sampling pumps, and/or tubing). If equipment is decontaminated in the field, then a minimum of two equipment rinsate blanks will be collected each day. One will be collected at the initiation of daily sampling activities and the other at the completion.

- **Field Blanks**. A field blank or source water blank will be collected at a rate of at least one blank per field event or one every 10 days, whichever is greater. The source blank monitors water used by the field operations for daily operations.

Table 3-1
Gas Chromatograph and Mass Spectrometer Volatiles
Comparison of Target Analytes From Resource Conservation and Recovery Act Appendix IX Groundwater Monitoring List and U.S. Environmental Protection Agency Contract Laboratory Program Target Compound List

RFA SV Workplan, Group IV
U.S. Naval Station
Mayport, Florida

Volatile Organic Compounds	Appendix IX	CLP TCL	Currently A Target Analyte	Detected at NAVSTA Mayport
Chloromethane		✓	✓	
Bromomethane		✓	✓	
Vinyl chloride	✓	✓	✓	
Chloroethane	✓	✓	✓	
Methylene chloride	✓	✓	✓	✓
Acetone	✓	✓	✓	✓
Carbon disulfide	✓	✓	✓	✓
Trichlorofluoromethane	✓		✓	✓
1,1-Dichloroethene	✓	✓	✓	
1,1-Dichloroethane	✓	✓	✓	✓
1,2-Dichloroethene (total)	✓	✓	✓	
Chloroform	✓	✓	✓	✓
1,2-Dichloroethane	✓	✓	✓	
2-Butanone	✓	✓	✓	✓
1,1,1-Trichloroethane	✓	✓	✓	
Carbon tetrachloride	✓	✓	✓	
Bromodichloromethane	✓	✓	✓	✓
1,2-Dichloropropane	✓	✓	✓	
cis-1,3-Dichloropropene	✓	✓	✓	
Trichloroethene	✓	✓	✓	✓
Benzene	✓	✓	✓	✓
Dibromochloromethane	✓	✓	✓	✓
1,1,2-Trichloroethane	✓	✓	✓	
trans-1,3-Dichloropropene	✓	✓	✓	
2-Chloroethylvinylether			✓	
Bromoform	✓	✓	✓	
2-Hexanone	✓	✓	✓	
Tetrachloroethene	✓	✓	✓	
1,1,2,2-Tetrachloroethane	✓	✓	✓	✓
Toluene	✓	✓	✓	✓
Chlorobenzene	✓	✓	✓	✓
Ethylbenzene	✓	✓	✓	✓
Styrene	✓	✓	✓	
Xylenes (total)				

See notes at end of table.

Table 3-1 (Continued)
Gas Chromatograph and Mass Spectrometer Volatiles
Comparison of Target Analytes From Resource Conservation and Recovery Act Appendix IX Groundwater Monitoring List and U.S. Environmental Protection Agency Contract Laboratory Program Target Compound List

RFA SV Workplan, Group IV
U.S. Naval Station
Mayport, Florida

Volatile Organic Compounds	Appendix IX	CLP TCL	Currently A Target Analyte	Detected at NAVSTA Mayport
4-Methyl-2-pentanone	✓	✓	✓	
1,3-Dichlorobenzene	✓		✓	
1,4-Dichlorobenzene	✓		✓	✓
1,2-Dichlorobenzene	✓		✓	
Acetonitrile	✓		✓	✓
Acrolein	✓		✓	✓
Acrylonitrile	✓		✓	
Chloroprene	✓		✓	
3-Chloropropene	✓		✓	
1,2-Dibromo-3-chloropropane	✓		✓	✓
1,2-Dibromoethane	✓		✓	
Dibromomethane	✓		✓	
1,4-Dioxane	✓		✓	
Propionitrile	✓		✓	
Ethyl Methacrylate	✓		✓	
Iodomethane	✓		✓	
Isobutyl alcohol	✓		✓	
Methacrylonitrile	✓		✓	
Methyl methacrylate	✓		✓	
Vinyl acetate	✓		✓	
Trans-1,4-dichloro-2-butene	✓		✓	
Dichlorodifluoromethane	✓		✓	
Pentachloroethane	✓		✓	
1,1,1,2-Tetrachloroethane	✓		✓	
1,2,3-Trichloropropane	✓		✓	

Notes: Appendix IX = 40 Code of Federal Regulations Part 264, Appendix IX, Ground Water Monitoring List. Analytical Methodology for Appendix IX is *Test Methods for Evaluation of Solid Wastes*, USEPA, SW 846, Third Edition, November, 1986 (and proposed update package, 1989.)
CLP TCL = U.S. Environmental Protection Agency Contract Laboratory Program, *Statement of Work for Organic Analysis, Multi-Media, Multi-Concentration*, Exhibit C, target compound list and contract required quantitation limits, OLM01.0, July 1993.
✓ = target analytes for environmental and quality control samples collected at each Solid Waste Management Unit.
NAVSTA = Naval Station.

Table 3-2
Gas Chromatograph and Mass Spectrometer Semivolatiles
Comparison of Target Analytes From Resource Conservation and Recovery Act Appendix IX Groundwater Monitoring List and U.S. Environmental Protection Agency Contract Laboratory Program Target Compound List

RFA SV Workplan, Group IV
U.S. Naval Station
Mayport, Florida

Semivolatile Organic Compounds	Appendix IX	CLP TCL	Currently A Target Analyte	Detected at NAVSTA Mayport
Acid Extractables				
Phenol	✓	✓	✓	✓
2-Chlorophenol	✓	✓	✓	
2-Metnylphenol	✓	✓	✓	✓
4-Methylphenol	✓	✓	✓	✓
2-Nitrophenol	✓	✓	✓	
2,4-Dimethylphenol	✓	✓	✓	✓
2,4-Dichlorophenol	✓	✓	✓	
4-Chloro-3-methylphenol	✓	✓	✓	
2,4,6-Trichlorophenol	✓	✓	✓	
2,4,5-Trichlorophenol	✓	✓	✓	
2,4-Dinitrophenol	✓	✓	✓	
4-Nitrophenol	✓	✓	✓	
2-Methyl-4,6-dinitrophenol	✓	✓	✓	
Pentachlorophenol	✓	✓	✓	✓
2,3,4,6-Tetrachlorophenol	✓		✓	
2,6-Dichlorophenol	✓		✓	
Benzoic Acid			✓	✓
Base-Neutral Compounds				
1,3-Dichlorobenzene[1]	✓	✓	✓	
1,4-Dichlorobenzene[1]	✓	✓	✓	
1,2-Dichlorobenzene[1]	✓	✓	✓	
Hexachloroethane	✓	✓	✓	
1,2,4-Trichlorobenzene	✓	✓	✓	
Naphthalene[2]	✓	✓	✓	✓
Hexachlorobutadiene	✓	✓	✓	
Hexachlorocyclopentadiene	✓	✓	✓	
2-Chloronaphthalene	✓	✓	✓	
Acenaphthylene[2]	✓	✓	✓	
Acenaphthene[2]	✓	✓	✓	✓
Dibenzofuran	✓	✓	✓	✓
Fluorene[2]	✓	✓	✓	✓
4-Chlorophenyl-phenylether	✓	✓	✓	
4-Bromophenyl-phenylether				

See notes at end of table.

Table 3-2 (Continued)
Gas Chromatograph and Mass Spectrometer Semivolatiles
Comparison of Target Analytes From Resource Conservation and Recovery Act Appendix IX Groundwater Monitoring List and U.S. Environmental Protection Agency Contract Laboratory Program Target Compound List

RFA SV Workplan, Group IV
U.S. Naval Station
Mayport, Florida

Semivolatile Organic Compounds	Appendix IX	CLP TCL	Currently A Target Analyte	Detected at NAVSTA Mayport
Hexachlorobenzene	✓	✓	✓	
Phenanthrene[2]	✓	✓	✓	✓
Anthracence[2]	✓	✓	✓	✓
Fluoranthene[2]	✓	✓	✓	✓
Pyrene[2]	✓	✓	✓	✓
Benzo(a)anthracene[2]	✓	✓	✓	✓
Chrysene[2]	✓	✓	✓	✓
Benzo(b)fluoranthene[2]	✓	✓	✓	✓
Benzo(k)fluoranthene[2]	✓	✓	✓	
Benzo(a)pyrene[2]	✓	✓	✓	✓
Indeno(1,2,3-cd)pyrene[2]	✓	✓	✓	
Dibenzo(a,h)anthracene[2]	✓	✓	✓	
Benzo(g,h,i)perylene[2]	✓	✓	✓	✓
bis(2-Chloroethyl)ether	✓		✓	
n-Nitroso-di-n-propylamine	✓	✓	✓	
Nitrobenzene	✓	✓	✓	
Isophorone	✓	✓	✓	
bis(2-Chloroethoxy)methane	✓	✓	✓	
Dimethylphthalate	✓	✓	✓	
2,6-Dinitrotoluene	✓	✓	✓	
2,4-Dinitrotoluene	✓	✓	✓	
Diethylphthalate	✓	✓	✓	✓
n-Nitrosodiphenylamine	✓	✓	✓	
di-n-Butylphthalate	✓	✓	✓	✓
Butylbenzylphthalate	✓	✓	✓	✓
3,3'-Dichlorobenzidine	✓		✓	
bis(2-Ethylhexyl)phthalate	✓	✓	✓	✓
di-n-Octylphthalate	✓	✓	✓	✓
n-Nitrosodimethylamine	✓		✓	✓
2-Picoline	✓		✓	
Diphenylamine	✓		✓	
4-Nitroaniline	✓	✓	✓	
Benzyl alcohol	✓		✓	
n-Nitrosopiperidine	✓		✓	
n-Nitrosomethylethylamine	✓		✓	
4-Chloroaniline	✓	✓	✓	
p-Phenylenediamine	✓		✓	

See notes at end of table.

Table 3-2 (Continued)
Gas Chromatograph and Mass Spectrometer Semivolatiles
Comparison of Target Analytes From Resource Conservation and Recovery Act Appendix IX Groundwater Monitoring List and U.S. Environmental Protection Agency Contract Laboratory Program Target Compound List

RFA SV Workplan, Group IV
U.S. Naval Station
Mayport, Florida

Semivolatile Organic Compounds	Appendix IX	CLP TCL	Currently A Target Analyte	Detected at NAVSTA Mayport
3- and 4-Methylphenol				
bis(2-Chloroisopropyl)ether	✓	✓	✓	
Pyridine	✓		✓	
3,3'-Dimethylbenzidine	✓		✓	
Isosafrole	✓		✓	
Phenyl-tert-butylamine	✓		✓	
1,2-Diphenylhydrazine			✓	
1,4-Naphthoquinone	✓		✓	
1-Naphthylamine	✓		✓	
Aramite	✓		✓	
Hexachloropropene	✓		✓	
Pronamide	✓		✓	
2-Acetylaminofluorene	✓		✓	✓
n-Nitrosodiethylamine	✓		✓	
3-Methylcholanthrene	✓		✓	
4-Nitroquinoline-1-oxide	✓		✓	
7,12-Dimethylbenz(a)anthracene	✓		✓	
n-Nitrosomorpholine	✓		✓	
p-(Dimethylamino)azobenzene	✓		✓	
Pentachlorobenzene	✓		✓	
Phenacetin	✓		✓	
Ethyl methanesulfonate	✓		✓	
Aniline	✓		✓	
Methyl methanesulfonate	✓		✓	
Hexachlorophene	✓		✓	
Pentachloronitrobenzene	✓		✓	
2-Nitroaniline	✓	✓	✓	
2-Methylnaphthalene[2]	✓	✓	✓	✓
2-Naphthylamine	✓		✓	
Methapyrilene	✓		✓	
4-Aminobiphenyl	✓		✓	
Benzidine			✓	
n-Nitroso-di-n-butylamine	✓		✓	
n-Nitrosopyrrolidine	✓		✓	
Safrole	✓		✓	
o-Toluidine	✓		✓	
1,2,4,5-Tetrachlorobenzene	✓		✓	

See notes at end of table.

Table 3-2 (Continued)
Gas Chromatograph and Mass Spectrometer Semivolatiles
Comparison of Target Analytes From Resource Conservation and Recovery Act Appendix IX Groundwater Monitoring List and U.S. Environmental Protection Agency Contract Laboratory Program Target Compound List

RFA SV Workplan, Group IV
U.S. Naval Station
Mayport, Florida

Semivolatile Organic Compounds	Appendix IX	CLP TCL	Currently A Target Analyte	Detected at NAVSTA Mayport
Acetophenone	✓		✓	
3-Nitroaniline	✓	✓	✓	
1,3,5-Trinitrobenzene	✓		✓	
5-Nitro-o-toluidine	✓		✓	
1,3-Dinitrobenzene	✓		✓	
Carbazole		✓		

[1] Analyte is both a volatile and semivolatile target analyte.
[2] Analyte is a polynuclear aromatic hydrocarbon.

Notes: Appendix IX = 40 Code of Federal Regulations Part 264, Appendix IX, Ground Water Monitoring List. Analytical Methodology for Appendix IX is *Test Methods for Evaluation of Solid Wastes*, USEPA, SW 846, Third Edition, November, 1986 (and proposed update package, 1989.)
CLP TCL = U.S. Environmental Protection Agency Contract Laboratory Program, *Statement of Work for Organic Analysis, Multi-Media, Multi-Concentration*, Exhibit C, target compound list and contract required quantitation limits, OLM01.0, July 1993.
✓ = Target analytes for environmental and quality control samples collected at each Solid Waste Management Unit.
NAVSTA = Naval Station.

Table 3-3
Gas Chromatograph Pesticides, Herbicides, and Polychlorinated Biphenyls Comparison of Target Analytes From Resource Conservation and Recovery Act Appendix IX Groundwater Monitoring List and U.S. Environmental Protection Agency Contract Laboratory Program Target Compound List

RFA SV Workplan, Group IV
U.S. Naval Station
Mayport, Florida

Pesticides, Herbicides, and Polychlorinated Biphenyls	Appendix IX	CLP TCL	Currently A Target Analyte	Detected at NAVSTA Mayport
Organochlorine Pesticides				
alpha-Benzene hexachloride (BHC)	✓	✓	✓	✓
beta-BHC	✓	✓	✓	✓
delta-BHC	✓	✓	✓	✓
gamma-BHC (Lindane)	✓	✓	✓	
Heptachlor	✓	✓	✓	✓
Aldrin	✓	✓	✓	
Heptachlor epoxide	✓	✓	✓	✓
Endosulfan I	✓	✓	✓	
Dieldrin	✓	✓	✓	
4,4'-Dichlorodiphenyldichloroethylene (4,4'-DDE)	✓	✓	✓	✓
Endrin	✓	✓	✓	
Endosulfan II	✓	✓	✓	
4,4'-Dichlorodiphenyldichloroethane (4-4'-DDD)	✓	✓	✓	✓
Endosulfan sulfate	✓	✓	✓	
4,4'-Dichlorodiphenyltrichloroethane (4,4'-DDT)	✓	✓	✓	✓
Methoxychlor	✓	✓	✓	
Endrin keytone		✓	✓	
Endrin aldehyde	✓	✓	✓	
alpha-Chlordane	✓	✓	✓	✓
gamma-Chlordane	✓	✓	✓	✓
Toxaphene	✓	✓	✓	
Organophosphorus Pesticides				
Aspon-SS	✓		*	
Triethylphosphorothioate	✓		*	
Thionazin	✓		*	
Parathion methyl	✓		*	
Phorate	✓		*	
Disulfoton	✓		*	
Sulfotepp	✓		*	
Famphur	✓		*	
Parathion ethyl	✓		*	
Dimethoate				

See notes at end of table.

Table 3-3 (Continued)
Gas Chromatograph Pesticides, Herbicides, and Polychlorinated Biphenyls
Comparison of Target Analytes From Resource Conservation and Recovery Act Appendix IX Groundwater Monitoring List and U.S. Environmental Protection Agency Contract Laboratory Program Target Compound List

RFA SV Workplan, Group IV
U.S. Naval Station
Mayport, Florida

Pesticides, Herbicides, and Polychlorinated Biphenyls	Appendix IX	CLP TCL	Currently A Target Analyte	Detected at NAVSTA Mayport
Chlorinated Herbicides				
2,4-Dichlorophenylacetic acid			*	
3,5-Dichlorobenzoic acid			*	
Dinoseb	✓		*	
(2,4,5-Trichlorophenoxy)-acetic acid (2,4,5-T)	✓		*	
α-(2,4,5-Trichlorophenoxy) propionic acid (2,4,5-TP) (Silvex)	✓		*	
2,4-Dichlorophenoxyacid (2,4-D)			*	
Polychlorinated Biphenyls (PCBs)				
Aroclor-1016	✓	✓	✓	
Aroclor-1221	✓	✓	✓	
Aroclor-1232	✓	✓	✓	
Aroclor-1242	✓	✓	✓	
Aroclor-1248	✓	✓	✓	✓
Aroclor-1254	✓	✓	✓	
Aroclor-1260	✓	✓	✓	✓

Notes: Appendix IX = 40 Code of Federal Regulations Part 264, Appendix IX, Ground Water Monitoring List. Analytical Methodology for Appendix IX is *Test Methods for Evaluation of Solid Wastes*, USEPA, SW 846, Third Edition, November, 1986 (and proposed update package, 1989.)
CLP TCL = U.S. Environmental Protection Agency Contract Laboratory Program, *Statement of Work for Organic Analysis, Multi-Media, Multi-Concentration*, Exhibit C, target compound list and contract required quantitation limits, OLM01.0, July 1993.
✓ = target analytes for environmental and quality control samples collected at each Solid Waste Management Unit.
* = target analytes for environmental and quality control samples collected at pesticide handling and storage sites.
NAVSTA = Naval Station

Table 3-4
Inorganics and Cyanide
Comparison of Target Analytes From Resource Conservation and Recovery Act Appendix IX Groundwater Monitoring List and U.S. Environmental Protection Agency Contract Laboratory Program Target Analyte List

RFA SV Workplan, Group IV
U.S. Naval Station
Mayport, Florida

Inorganics and Cyanide	Appendix IX	CLP TAL	Currently A Target Analyte	Detected at NAVSTA Mayport
Aluminum		✓		
Antimony	✓	✓	✓	✓
Arsenic	✓	✓	✓	✓
Barium	✓	✓	✓	✓
Beryllium	✓	✓	✓	✓
Cadmium	✓	✓	✓	✓
Calcium		✓	✓	✓
Chromium	✓	✓	✓	✓
Cobalt	✓	✓	✓	✓
Copper	✓	✓	✓	✓
Iron		✓	✓	✓
Lead	✓	✓	✓	✓
Magnesium		✓	✓	✓
Manganese		✓	✓	✓
Mercury	✓	✓	✓	✓
Nickel	✓	✓	✓	✓
Potassium		✓	✓	✓
Selenium	✓	✓	✓	✓
Silver	✓	✓	✓	✓
Sodium		✓	✓	✓
Thallium	✓	✓	✓	✓
Tin	✓		✓	✓
Vanadium	✓	✓	✓	✓
Zinc	✓	✓	✓	✓
Cyanide	✓	✓	✓	✓

Notes: Appendix IX = 40 Code of Federal Regulations Part 264, Appendix IX, Ground Water Monitoring List. Analytical Methodology for Appendix IX is *Test Methods for Evaluation of Solid Wastes*, USEPA, SW 846, Third Edition, November, 1986 (and proposed update package, 1989.)
CLP TAL = U.S. Environmental Protection Agency Contract Laboratory Program, *Statement of Work for Inorganic Analysis, Multi-Media, Multi-Concentration*, target analyte list and contract required quantitation limits, ILMO1.0, March 1990.
✓ = target analytes for environmental and quality control samples collected at each Solid Waste Management Unit.
NAVSTA = Naval Station.

4.0 PRELIMINARY RISK SCREENING

A human health and ecological risk screening will be conducted for the Group IV RFA/SV SWMUs 47, 53, and 55 at NAVSTA Mayport to support decisions to conduct an RFI or to recommend no further action. The screening will consist of comparing analytical results with a number of benchmark screening values. These benchmark values are taken from the risk-based screening concentrations, the Superfund proposed soil screening levels, and the cleanup goals for military sites in Florida presented in the Group I and II RFA/SV report for NAVSTA Mayport (ABB-ES, 1995).

Surface and Subsurface Soil Analytical Results. The target analytes detected in the environmental samples will be compared to background screening values computed from station-wide surface and subsurface soil samples (ABB-ES, 1994; 1995b), benchmark values from USEPA Region III risk based concentrations (RBC) (USEPA, 1994a), the USEPA Superfund soil screening levels (SSLs) (USEPA, 1994b), and the soil cleanup goals for Florida (FDEP, 1995). Surface and subsurface soil concentrations will be compared to an aggregate residential exposure (child and adult) for USEPA Region III RBCs and USEPA SSLs. Values for Florida cleanup goals consist of aggregate residential exposure (child and adult) for surface soil, whereas subsurface soil concentrations were compared to an excavation worker exposure.

Each of the benchmark criteria are human health based and represent the lower of either a noncarcinogenic hazard index (HI) where values of less than 1 represent a concentration at which noncarcinogenic effects are not likely, or a lifetime excess cancer risk of $1x10^{-6}$, which represents a chance of 1 in 1,000,000 for an adverse carcinogenic effect for a continuous lifetime exposure. The concentrations listed for the USEPA Region III RBCs correspond to an HI of 0.1, whereas the USEPA Superfund SSLs and the State of Florida cleanup goals are based on an HI of 1. The Federal National Oil and Hazardous Substance Pollution Contingency Plan final rule (40 CFR, Part 300) states that, for carcinogens, a lifetime excess cancer risk in the range of $1x10^{-4}$ (a chance of 1 in 10,000 for an adverse carcinogenic effect for a continuous lifetime exposure) to $1x10^{-6}$ represents concentrations that are protective of human health.

Groundwater Analytical Results. The target analytes detected in the environmental samples will be compared with background screening values computed from station-wide background groundwater samples (ABB-ES, 1994; 1995b), benchmark values consisting of USEPA Region III RBCs (USEPA, 1994a), and Florida groundwater guidance concentrations (FDEP, 1994). The Florida groundwater guidance concentrations consist of promulgated and unpromulgated values. Promulgated and unpromulgated values that are exceeded will be identified in the text. Each of the benchmark criteria are human health based and represent the lower of either a noncarcinogenic HI of 1 or a lifetime excess cancer risk of $1x10^{-6}$. Benchmark values for a noncarcinogenic HI of 1 or less represent a concentration where noncarcinogenic effects are not likely. A benchmark value for a lifetime excess cancer risk of $1x10^{-6}$ represents a chance of 1 in 1,000,000 for an adverse carcinogenic effect for a continuous lifetime exposure.

Surface Water Samples. The target analytes detected in the environmental samples will be compared to station wide background surface water samples (ABB-ES, 1994; 1995b), benchmark values from ambient water quality from the Office of Science

Science and Technology. Health and Ecological Criteria Division, Washington D.C., May 1, 1991 (USEPA, 1991a), and Florida Surface Water Quality Standards.

Sediment Samples. The target analytes detected in the environmental samples will be compared to station-wide background sediment samples (ABB-ES, 1994; 1995b) benchmark values from effects range-low (ER-L) and effects range-median (ER-M) values from The Potential for Biological Effects of Sedimentsorbed Contaminants Tested in the National Status and Trends Program, National Oceanic and Atmospheric Administration (Long and others, 1993), and threshold effects level and probable effects level from Approach to the Assessment of Sediment Quality in Florida Coastal Water, MacDonald Environmental Sciences, Ltd. (MacDonald, November 1994) whichever is the lower value.

The ER-L value represents a concentration at the low end of a range of values in which adverse biological effects have been observed. The ER-M represents a concentration approximately midway in a range of values associated with adverse biological effects (Long and others, 1993). The no observed effects level represents a concentration in the upper range of values where no adverse biological effects are observed. The PEL represents a concentration in the lower range of values that are usually associated with adverse biological effects (MacDonald, 1994).

5.0 QUALITY ASSURANCE AND QUALITY CONTROL

QA/QC standards and procedures will comply with the approved QAPP and Site-Specific Quality Assurance Plan contained in Appendices A and B, respectively, of the RFI workplan, Volume II (ABB-ES, 1991). QC samples will be collected in accordance with Chapter 11.0 of the QAPP. Decontamination of field sampling equipment will be in accordance with Section 6.3 of the QAPP and the Technical Memorandum, Decontamination Procedures, located in Appendix D of this RFA SV workplan. Sample handling and project documentation will be in accordance with Section 3.1 of the RFI workplan, Volume II, and the referenced sections of the QAPP. Laboratory QA/QC will be in accordance with the laboratory QAPP located in Appendix C of the RFI workplan, Volume II.

6.0 HEALTH AND SAFETY

Health and safety requirements will be in accordance with the general Health and Safety Plan located in Volume III of the RFI workplan (ABB-ES, 1991), and the site-specific Health and Safety Plans located in Appendix E of this RFA SV workplan.

7.0 SCHEDULE

The schedule for completion of RFA SV activities at Group IV SWMUs is presented in the Final Corrective Action Management Plan for NAVSTA Mayport, (ABB-ES, 1995a). The schedule assumes ready access to all sites and no delays due to the securing of required permits. The schedule may also be modified by the nature and extent of regulatory review cycles and new data collected during the RFI.

REFERENCES

ABB Environmental Services, Inc. (ABB-ES), 1991, Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Workplan, Volumes I, II, and III (Interim Final): prepared for Southern Division, Naval Facilities Engineering Command, October.

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A.T. Kearney, Inc., 1989, RCRA Facility Assessment of the Naval Station Mayport, Jacksonville, Florida (Draft): prepared for U.S. Environmental Protection Agency (USEPA), September.

Briley, Wild & Associates, Inc., 1985, Wastewater Collection System Evaluation Mayport, Florida: prepared for Staff Civil Engineering, Naval Station Mayport, September.

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FDEP, 1995, Memorandum from John Ruddell, Subject: Soil Cleanup goals for Florida; Division of Waste Management, FDEP, Tallahassee, Florida, July.

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REFERENCES (Continued)

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Rust Environment and Infrastructure (Rust), 1995, Remedial Action Plan Naval Station Mayport, Building 265 - Naval Exchange Service Station: prepared for Southern Division, Naval Facilities Engineering Command, January.

Smith and Gillespie Engineers, Inc., 1988, Mayport Naval Station Mayport, Florida Evaluation Report of Cleaning, TV Inspection, Joint Testing and Sealing of Gravity Sewers: prepared for Staff Civil Engineer Naval Station Mayport, July.

U.S. Environmental Protection Agency (USEPA), 1983, Methods for Chemical Analysis of Water and Wastes: USEPA, PB 84-128677, March.

USEPA, 1986, Test Methods for Evaluation of Solid Wastes: USEPA, SW 846, Third Edition, November 1986 (and proposed update package, 1989), and Code of Federal Regulations (CFR) Title 40, Part 264, Appendix IX.

USEPA, 1988a, HSWA Permit No. FL9-170-024-260: Region IV, March 25, 1988, revised June 15, 1993.

USEPA, 1988b, Guidance Document for Assessment of RCRA Environmental Data Quality: draft, June.

USEPA, 1988c, Laboratory data validation functional guidelines for evaluation inorganic analyses: July.

USEPA, 1989a, Interim final RCRA facility investigation guidance, four volumes: Waste Management Division, Office of Solid Waste, EPA 530/SW-89-031, May.

USEPA, 1989b, Risk Assessment Guidance for Superfund; Volume I, Human Health Evaluation Manual (Part A), Interim Final: Office of Emergency and Remedial Response, EPA/540/1-89/002.

REFERENCES (Continued)

USEPA, 1990, National functional guidelines for organic data review: December (revised June, 1991).

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USEPA, 1994b, Soil Screening Guidance: Office of Solid Waste and Emergency Response, hazardous Site Control Division, EPA/540/R-94/101, December.

APPENDIX A

CORRESPONDENCE REGARDING SWMU 54 AND AOCs A AND B

DEPARTMENT OF THE NAVY

NAVAL STATION
MAYPORT FLORIDA 32228-0113

5090.15
5090.16
Ser N4E4/ 00
14 AUG 1995

Mr. Joseph R. Franzmathes
Waste Management Division, Region IV
U.S. Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, GA 30365

Subj: SWMU 54-OIL/WATER SEPARATORS,
AOC A-FUEL DISTRIBUTION LINES,
AOC B-PRODUCT STORAGE TANKS,
NAVAL STATION MAYPORT, HSWA
PERMIT FL9 170 024 260

Dear Mr. Franzmathes:

Naval Station Mayport (NAVSTA) requests the official transfer of the management and further investigation of SWMU 54 - Oil/Water Separators, AOC A - Fuel Distribution Lines, and AOC B - Product Storage Tanks at Buildings 25 and 265 to FAC 62-761 and, if appropriate, FAC 62-770 programs.

SWMU 54 and both AOCs are currently managed under FAC 62-761 and the Alternate Procedures Agreement between the State of Florida and the Navy. If petroleum contamination is found at these sites during scheduled replacement of the associated tanks, they will then be managed under the FAC 62-770; therefore, there is no need to investigate them under the HSWA program.

NAVSTA requested concurrence on this action from the Florida Department of Environmental Protection (FDEP). FDEP concurrence was provided by the enclosed letter of June 28, 1995.

If you have any questions, please contact Cheryl Mitchell, N4E4, at 904-270-6730.

Sincerely,

Robert P. Walden

ROBERT P. WALDEN
Lieutenant Commander, CEC, U.S. Navy
Staff Civil Engineer
By direction of
the Commanding Officer

Encl:
(1) FDEP Tallahassee ltr

Copy to:
FDEP Tallahassee (E. Nuzie)
COMNAVBASE Jacksonville (N3)
SOUTHNAVFACENGCOM (Code 1852)
ABB Environmental Services
P LAYNE

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. [illegible]
Secretary

June 28, 1995

Lt. Commander Douglas P. Tomlinson
Staff Civil Engineer
Department of the Navy
Naval Station Mayport
Mayport, FL 32228-0112

file: swmu54aoc.doc

RE: Request to remove SWMU 54 and Areas of Concern A and B from current HSWA Investigation

Dear Commander Tomlinson:

This is in response to your letter of June 12, 1995 requesting that SWMU 54, consisting of twelve oil/water separators, Area of Concern A, fuel distribution system, and Area of Concern B, underground storage tanks at Buildings 25 and 265, be deleted from investigation under the ongoing HSWA program. It is my understanding that these areas are presently being managed under the Chapter 62-761 and Chapter 62-770, F.A.C., programs; therefore, I concur with your request that they be removed from the HSWA investigation.

By copy of this letter, I am informing Mr. Jay Bassett, Remedial Project Manager, U.S. Environmental Protection Agency, Atlanta, GA, of my concurrence with your request. As you know, EPA must also concur with the proposed actions for SWMU 54 and Areas of Concern A and B.

If you have questions or require further clarification, please contact me at (904) 488-3935.

Sincerely,

James H. Cason
Remedial Project Manager

cc: Cheryl Mitchell, NAVSTA Mayport
Jay Bassett, EPA Region IV, Atlanta
John Mitchell, FDEPNatural Resource Trustee
Satish Kastury, FDEP, Tallahassee
Ashwin Patel, FDEP Northeast District, Jacksonville
Jerry Young, City of Jacksonville
TJB by ESN JJC by ESN ESN ESN

DEPARTMENT OF THE NAVY
NAVAL STATION
MAYPORT, FLORIDA 32228-0112

IN REPLY REFER TO:
5090.15
5090.16
Ser N4E4/00166
07 JUN 1995

Mr. Eric S. Nuzie
Federal Facilities Coordinator
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subj: SWMU 54 - OIL/WATER SEPARATORS AOC A - FUEL DISTRIBUTION SYSTEM, AOC B - PRODUCT STORAGE TANKS, NAVAL STATION MAYPORT, HSWA PERMIT #FL9 170 024 260

Dear Mr. Nuzie:

Naval Station Mayport (NAVSTA) is requesting your concurrence to officially transfer the management and further investigation of subject SWMU and Areas of Concern (AOCs) to the FAC 62-761 and, if appropriate, FAC 62-770 programs.

SWMU 54 and both AOCs are currently managed under FAC 62-761 and the Alternate Procedures Agreement between the State of Florida and the Navy. If petroleum contamination is found at these sites during scheduled replacement of the associated tanks, they will then be managed under the FAC 62-770; therefore, there is no need to investigate them under the HSWA program.

If you have any further questions regarding this subject, NAVSTA's point of contact is Cheryl Mitchell, N4E4, at 904-270-6730.

Sincerely,

Douglas P. Tomlinson

DOUGLAS P. TOMLINSON
Lieutenant Commander, CEC, U.S. Navy
Staff Civil Engineer
By direction of
the Commanding Officer

Copy to:
USEPA Region IV (4WD-FFB J. Bassett)
SOUTHNAVFACENGCOM (Code 1852, D. Driggers)
ABB-Environmental Services (P[redacted])
COMNAVBASE Jacksonville (N3)

5090.16
Ser N4E4/ 00224
27 OCT 1994

From: Commanding Officer, Naval Station, Mayport
To: Commander, Naval Base, Jacksonville (N3)

Subj: NAVY-FLORIDA UNDERGROUND STORAGE TANKS (UST) ALTERNATE PROCEDURES AGREEMENT (APA)

Ref: (a) COMNAVBASE Jacksonville ltr 5090 Ser N3/1291 of 20 Sep 94

Encl: (1) TIMS of Oct 94 on 5-¼" diskette
(2) TIMS Database Tables 3.1 and 3.2 of 26 Oct 94 (8 pages)
(3) Navy Regulated UST Compliance Actions (Strategy Form) for NAVSTA Mayport/ID FL16MAYNS, UST Registration No. 16826008 of Oct 94 (3 pages)

1. Enclosures (1) through (3) are provided as requested by reference (a).

2. Naval Station Mayport's point of contact is Ms. Cheryl Mitchell, N4E4, at 270-6730.

J. S. VEAL
By direction

Copy to: (w/o encl 1)
FISC Jacksonville (Code 700)
PWC Jacksonville (Code 300)
SOUTHNAVFACENGCOM (Code 18)

TAD N4

SIGN N4A

LAND N4E

N4E4

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 12
To [illegible] | From CHERYL MITCHELL
Co. | Co.
Dept. | Phone # 904-270-6730
Fax # 703-769-9192 | Fax #

bc: N4E Chron, N4E4

c:\-St-Tank\TIMSAPA3.CNB/pl/10-27

NAVY REGULATED UST COMPLIANCE ACTIONS

ACTIVITY/ID NO.: NAVSTA MAYPORT/FL16MAYNS
UST REGISTRATION NO.: 168626008
DATE THIS REPORT: OCTOBER 1994

TANK #	IN COMPL?	COMPL STRATEGY	PAST FY ACTIONS	FUTURE FY ACTIONS	FUND SOURCE	COMMENTS
G1591	NO	REPL W/UST	FY93 SUBMIT STEP 1 FY94 DESIGN	FY95 CONSTRUCT FY96 COMPLIANCE	OMN OMN/PA	
G436 G437 G1363	NO	REPL W/AST REPL W/AST REPL W/UST	FY93 SUBMIT STEP 1 FY94 DESIGN	FY95 CONSTRUCT FY96 COMPLIANCE	OMN OMN/PA	
2601	NO	REMOVE	FY93 DESIGN	FY95 CONSTRUCT FY96 COMPLIANCE	PA	NO CONTRACT IN FY94, PWC DID NOT AWARD AS SCHEDLD.
349A 349B	NO	REPL W/AST	FY93 SUBMIT STEP 1 FY94 DESIGN	FY95 CONSTRUCT FY96 COMPLIANCE	OMN OMN/PA	
358B	YES	REMOVE WHEN TRAINER IS OPERATIONAL	FY93 PCR FOR REMOVAL	FY95 DESIGN FY96 CONSTRUCT FY97 COMPLIANCE	OMN PA	FY94 DESIGN DELAYED. NEW TRAINER IS NOT OPERATIONAL AND TANK CAN NOT BE REMOVED UNTIL THIS OCCURS.
G1552	NO	REPL W/UST	FY93 SUBMIT STEP 1 FY94 DESIGN	FY95 CONSTRUCT FY96 COMPLIANCE	OMN OMN/PA	
1342 1417 1490 1512 1515 1363 1864 1865 1866	NO	REPL W/UST	FY93 SUBMIT STEP 1 FY94 DESIGN	FY95 CONSTRUCT FY96 COMPLIANCE	OMN OMN/PA	

TOTAL P.02

(2) CP 27

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

April 7, 1995

Mr. Bryan Kizer
Department of the Navy
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive, P.O. Box 190010
North Charleston, S.C. 29419-9010

file: b25rap.doc

RE: Remediation Work Plan for Building 25, Revision O, U.S. Naval Station Mayport, Delivery Order 0010, Task 3, Phase 2, Bechtel Environmental Incorporated

Dear Bryan:

Mr. Greg Brown, P.E., and I have reviewed the above document dated January, 1995 (received March 29, 1995) and determined that it does not follow Department rules and guidance or previous RAP review comments. I am attaching Mr. Brown's comments for your information.

In the interest of time, we propose the following course of action: Mr. Brown will review the original RAP and revisions for consistency with Department rules, guidance and earlier RAP review comments. If the documents are deemed adequate, these documents will be approved and a Certification of Approval will be issued, contingent upon conducting a pilot vent test. The Navy can then proceed with the pilot vent test, prior to construction, and submit the results of the test to the Department. If a RAP modification is necessary, it will be submitted to the Department for review and approval prior to construction. If a RAP modification is not necessary the Navy can proceed with construction. The engineer of record, or successor, will submit signed, sealed and dated record drawings after construction certifying conformance of the constructed project with the approved RAP and its approved modifications. Construction shop drawings or work plans do not need to be submitted to the Department for review if the constructed remedial system complies with the approved RAP and its approved modifications. It is noted that this procedure is not the usual manner of review of such documents but has been proposed in the interest of time. For future projects of this nature, the Department will require that the Navy incorporate all pilot test data into a RAP prior to submission for approval.

Post-it™ brand fax transmittal memo 7671	# of pages ▸ 6
To MARK LEIBERMAN	From JAN BOWER - NAVY
Co. ABB	Co. NS MAYPORT - SCE
Dept.	Phone # 270-6730
Fax # 703-769-8182	Fax # 270-6884

Please understand that this project does not presently have an approved RAP. Please contact me and let me know how you want to proceed.

Sincerely,

James H. Cason
Remedial Project Manager

cc: Jan Bouvier, NAVSTA Mayport
Jay Bassett, EPA Region IV, Atlanta
Brian Cheary, FDEP Northeast District, Jacksonville
John Mitchell, Natural Resources Trustee, Tallahassee
Peggy Layne, P.E., ABB, Tallahassee

TJB JJC ESN

Memorandum

Florida Department of Environmental Protection

TO: Jim Cason, P.G., Remedial Project Manager, Technical Review Section

THROUGH: Tim Bahr, P.G., Supervisor, Technical Review Section

FROM: Greg Brown, P.E., Professional Engineer II, Technical Review Section

DATE: April 3, 1995

SUBJECT: Remediation Work Plan For Building 25, Revision 0, U.S. Naval Station, Mayport, Florida, Delivery Order 0010, Task 3, Phase 2, BEI, Inc.

The Department received the subject document (dated January 1995) on March 29, 1995. I reviewed the administrative record you provided with this document and it appears to me that the Navy is not being consistent with our rules, guidance, or RAP review comments. Here are the facts as reflected in the records you provided:

- The Navy submitted a RAP for Building 25 (dated September 1993), prepared by RUST, Inc., to the Department on September 14, 1993.
- The Navy submitted a revision to the RAP (Revision 1; dated April 1994) to the Department on May 9, 1994.
- The Department sent comments to the Navy from the Engineering Support Section (dated June 2, 1994) on the original RAP and its revisions on June 13, 1994.
- The Navy submitted their responses to comments (dated August 15, 1994) to the Department on September 6, 1994.
- The Department approved the Navy's responses to comments and approved the pilot vent test by letter to the Navy dated October 10, 1994.
- The Department could not approve the RAP and its revisions until the Navy completed the pilot vent test and modified the RAP.
- The Department reiterated it position to the Navy by letter dated February 2, 1995.
- The Department received the subject document. The Navy did not include the requested vent test data or a revised RAP. The Department has not approved the RAP.

It is obvious from this chronology that this project has not progressed efficiently despite consistent and timely input from the Department. I propose the following approach to help the Navy proceed with this project in a timely and cost-effective manner and to compensate for past inefficiencies while still maintaining protectiveness:

- I will review the original RAP and revisions for consistency with Department rules, guidance, and earlier RAP review comments.
- I will approve the RAP and issue a Certification of Approval contingent upon conducting the pilot vent test if the RAP and its revisions are adequate in my professional judgment.
- The Navy will conduct the pilot vent test before construction. The Navy will report the results of the pilot vent test to the Department before construction and request a RAP modification if necessary before construction.
- Before or during construction, the Navy does not need to submit construction workplans or shop drawings as long as the constructed remedial system conforms with the approved RAP and its approved modifications.
- The engineer of record or qualified successor will submit signed, sealed, and dated record drawings certifying conformance with the approved RAP and its approved modifications.

The Navy must understand that this is an exception to normal Department guidance made to meet the specific needs of this project. In the future, the Department will require the Navy to provide all pilot-scale test data needed to support the engineering decisions documented in a RAP before approval. Having adequate site-specific data to support design decisions is good engineering practice, and I hope the Navy will agree to this approach.

I refer to a portion of the letter to Mr. Joe McCauley, Code 18A, from the Department dated January 5, 1995, to further emphasize what the Department expects:

> "... Remediation of petroleum contaminated sites require preparation of Remedial Action Plans. The RAP is an engineering document that details both the conceptual and site-specific engineering decisions required to fully describe the remedial action. A registered professional engineer signs and seals the RAP as the engineer of record when submitting the RAP to the Department for review and approval... The approved RAP is used for construction of the remedial action. Construction shop drawings are not required by the Department for review and approval during construction unless a modification to the RAP is necessary. Signed and sealed record drawings are submitted to the Department after construction to document compliance with the approved RAP."

If you have any questions, please call me.

Lawton Chiles
Governor

Department of Environmental Protection

Twin Towers Building
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
2600 Blair Stone Road

February 27, 1995

Mr. Byas Glover
Code 1842
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
P.O. Box 190010
North Charleston, SC 29419-9010

File:b265com.do

Subject: CAR Addendum 3 for Building 265, NAVSTA Mayport

Dear Mr. Glover:

I have reviewed the CAR Addendum dated January 19, 1995 (received January 27, 1995) and have found it to satisfy the requirements of Chapter 62-770, F.A.C. A modified RAP should be prepared for the site and submitted to the Department for approval. The following comments should be considered during preparation of the new RAP which should address the changes in site conditions since the previous RAP for the site was prepared in July, 1993.

1. The graphic presentation of recent data contained in Addendum 3 indicates that ground water contamination and free product are migrating downgradient to the east. Although, according to the shape of the contaminated soil, the southerly drainage ditch may have some influence on contaminant migration, the shape of the revised ground water plume seems to indicate a greater influence from the easterly drainage canal. Data from MAY-265-17, MAY-265-18, MAY-265-20 and MAY-265-21 may indicate a more northerly placement of the plume; MAY-265-17 and MAY-265-18 data are not trend data and represent only the July sampling event.

2. To expedite site cleanup, please submit the modified RAP within 60 days. If you anticipate delay beyond this date, you may apply for an extension of time for the submittal date. Significant delay may necessitate an additional ground water sampling event. Additionally, as the plume continues to migrate prior to RAP implementation, impact to surface water may occur. If sampling of MAY-265-20 indicates that the Benzene concentration exceeds the surface water standard of 71.28 ug/L, then surface water and sediment sampling and analysis from the drainage canal east, northeast and southeast of MAY-265-20 should be performed.

MEI
Environmental Svcs.

MAIN OFFICE:
2136 Gallows Road
Suite H
Dunn Loring, VA 22027
703-207-0500
703-207-3981(fax)

FIELD OFFICE:
Next to Bldg. 1267
Naval Station Mayport
Mayport, FL 32227
904-249-0024
904-249-0063(fax)

January 19, 1995

Duval Cty Reg & Bioenv Svcs
Water Quality Division
421 W. Church Street Suite 412
Jacksonville, FL 32203

ATTN: Lewis Shields

RE : DACA17-94-C-0084 Remove/Replace Fuel Storage Tanks, Mayport Naval Station, FL

SUB: Mayport Naval Station DER FAC ID#168626008
MEI PCC053987

Dear Mr. Shields:

We are hereby giving our notification for the closure, replacement and/or upgrade of the various storage tank systems on the above stated project. Enclosed you will find page C-2 of the Contract Plans and page 3 of the Contract Specifications section 00010, "Description of Work", which show the action required for each tank, as well as the schedule of priority.

Pursuant to our telephone conversation on January 6, MEI will commence work during the week of February 6, 1995. An estimated completion time would fall between four to six months thereafter. The required Tank Registration Forms are being generated and will be forthcoming.

MEI letter of 01-19-95
(cont'd)

In order to further discuss the schedule of work and the procedural details, we would like to meet at your convenience. Please call us at our office trailer number, 904-249-0024.

Sincerely,

Phillip W. Giuliani

encl.

cc: DER/Stg Tank Reg Section & Bureau of Waste Cleanup
2600 Blair Stone Road
Tallahassee, FL 32399-2400

DER/Stg Tank Prgm, NE District
7825 Baymeadows Way, Suite B200
Jacksonville, FL 32256-7577

Rebull & Associates
P.O. Box 85
Arlington, VA 22210-0085

APPENDIX B

DIRECT PUSH TECHNOLOGY DESCRIPTIONS

B-1 SITE CHARACTERIZATION AND ANALYSIS PENETROMETER SYSTEM (SCAPS)

B-2 TERRAPROBE℠ TOOLS DESCRIPTION

APPENDIX B-1

SITE CHARACTERIZATION AND ANALYSIS PENETROMETER SYSTEM (SCAPS)

The following are excerpts from the Navy's literature on SCAPS.

1.1 Program Purpose The purpose of the Site Characterization and Analysis Penetrometer System (SCAPS) is to develop real-time subsurface screening capability of petroleum, oil and lubricant (POL) at Navy activities; and provide concurrent technical transfer of this technology to industry for commercialization and wide spread use.

1.2 Program Objective The objective of the program is to expedite the development and regulatory acceptance of SCAPS; and concurrently field the system to support urgent Navy site characterization issues. Two additional vehicles are under construction and scheduled for delivery during early fiscal 1995 to support the existing system.

1.3 Background The Naval Command, Control and Ocean Surveillance Center RDT&E Division (NCCOSC), in collaboration with the Army and the Air Force, has developed a fiber-optic-chemical sensor system for detection of petroleum hydrocarbons; and has integrated it with a cone penetrometer system for use in real-time subsurface screening of petroleum products. The SCAPS provides a capability for real-time measurements of POLs to depths of 150 feet with a vertical spacing of one inch as the probe is pushed into the ground. A principle advantage of this system over traditional hollow-stem auger collected samples (and subsequent laboratory analysis) is that the extent of subsurface petroleum contaminant plumes can be accurately delineated in real-time. This method provides improved vertical spatial resolution of the distribution of the contamination as the probe is pushed into the ground; hence, more accurately placing monitoring wells; and in many cases reduce the number of wells required.

1.4 Program Scope On 8 March 1993 NCCOSC took delivery of the first SCAPS (NAVY) vehicle consisting of a truck chassis, van body and hydraulic systems. NCCOSC then began the installation, integration and checkout of the fluorometry system, computer systems and all other support and utility equipment. This unit is the prototype and is designated as Engineering Development Model One (EDM-1).

EDM-1 began system shake down and initial field operations in July 1993 at Naval Air Station, North Island and finished in October. Field operations will continue throughout 1994 under a schedule coordinated by Naval Facilities Engineering Service Center (NFESC).

Concurrent with field operations, SCAPS (NAVY) will undergo the process of regulatory acceptance. This will involve site characterization operations whereby soil data collected by EDM-1 will be compared to soil sample data collected by traditional hollow stem auger systems (including laboratory analysis). These operations will be performed in accordance with specific detailed test plans for designated sites. The collected data will be analyzed by NCCOSC and other designated independent laboratories. The results will be presented to the regulatory agencies for acceptance of SCAPS as a valid method for hazardous waste site characterization.

On July 27, 1993 NCCOSC awarded a contract for two more vehicles (with options for more if requested). The first of these was delivered in February 1994 and the second in March. These two vehicles will be outfitted and checked out by NCCOSC just like EDM-1. The intended availability for field operations is fall of 1994. They will be designated EDM-2 and EDM-3. These units will be assigned

to the field; presumably one to the west coast and the other to the east coast. They will be operated and maintained by NFESC.

As part of a Department of Defense effort, the Navy (NCCOSC) continues to collaborate with the Army and the Air Force in the refinement and development of cone penetrometer sensors; the sharing of technical data and the exchange of technical documentation. In addition, efforts continue at NCCOSC to develop other sensor systems that will extend the capability of the cone penetrometer to other classes of contaminants.

NCCOSC is also pursuing a Cooperative, Research and Development Agreement (CRADA) with industry. The goal is to transfer the POL sensor technology to industry for commercialization to support national initiatives; and to satisfy government and industry needs.

1.5 System Description The SCAPS (see Figure 1) is a suite of equipment mounted on a specifically engineered 6x6 truck (60,000 pound weight class) designed for operations at hazardous waste sites. At the heart of SCAPS are the sensors. These special sensors are designed to detect petroleum products and to determine soil characteristics. SCAPS also includes survey and site mapping equipment. In addition, there is equipment for penetrometer rod decontamination and for backfilling each penetrometer push cavity.

1.6 Sensors Real time detection of petroleum products occurs as the penetrometer probe is pushed into the ground. POLs in the soil are detected by their fluorescent response to excitation by Ultraviolet light. To make a measurement, the exciting radiation is produced by firing a nitrogen laser at 10 pulses per second. The laser pulse is directed into a 365 micron optical fiber that passes down the center of the penetrometer rod. The fiber terminates at a 6.35 millimeter diameter sapphire window that passes the light at 337 nanometers causes electrons in the POLs to move into more energetic states. At the end of each pulse, the electrons return to their original state and simultaneously fluoresce. The fluorescent signal is collected by another fiber and is carried back up through the penetrometer rod to the spectrograph. In the spectrograph the fluorescent signal is dispersed; and the energy distribution as a function of wavelength is measured using a linear photodiods array.

The data is recorded via computer and quantified against a standard curve to provide a fluorescent response measurement (see Figure 4). The response is directly related to the concentration of the petroleum products in the soil. This system is calibrated using a laboratory standard at the beginning and at the end of each push/pull cycle to verify that performance does not change.

The penetrometer tip is equipped with sensors that can determine the physical characteristics of the soil as the probe is pushed through the ground. The tip has strain gauges that yield compression and sleeve friction data. This data is passed up through the center of the penetrometer rod, recovered via computer and is used in a classification scheme to identify the types of soil encountered by the probe. This data is also used to shut down the system and protect the probe when excessive resistance is encountered during the push cycle.

1.7 Data Collection The penetrometer sensor data is fed back to the data collection system located in the computer/instrumentation room of the van (see Figure 5). The data collection system is comprised of a data acquisition system

and a post processing system, each having a separate computer. The data acquisition computer controls the data collection process and stores the data on a hard disk. The post processing system analyzes the data and provides a preliminary report (real time) in the form of a plot, indicating fluorescent spectral intensity (petroleum product contamination) relative to probe depth. Other data, such as penetrometer cavity location (mapping information), hole depths and soil characteristics are also available. Detailed analysis will be performed at NCCOSC and a final report issued. This final data will also be utilized in the development and refinement of sensors; and for refining the data collection process.

1.8 Hydraulic System The hydraulic system is composed of two separate subsystems; vehicle leveling and hydraulic penetrometer thrust system. The vehicle leveling system is made up of four hydraulic thrust cylinders with individual soil reaction plates and is attached to the truck chassis. The hydraulic controls are located in the hydraulic control room of the truck van body. This system provides leveling of the SCAPS in both the longitudinal and the transverse axes so that it is perpendicular to the axis of force of the penetrometer thrust system.

The hydraulic penetrometer thrust system is made up of a pair of thrust cylinders and a bi-directional gripping clamp that pushes the penetrometer rod into the ground at a rate of three feet per minute. This system is located in the hydraulic control room on the center line of the truck chassis. The penetrometer rods are 39 inch sections joined together as the probe is pushed into the ground. A cable passes through the center of the rods connecting the probe to the sounding system and the data acquisition equipment. The rods are removed from the soil by reversing the position of the gripping clamp and pulling up on the rods. The rods, cable and probe are then stowed on storage racks in the hydraulic control room.

1.9 Survey/Site Mapping Survey and mapping the area is accomplished using magnetic and electromagnetic induction equipment. These devices sense magnetic anomalies within the earth's magnetic field and are used to detect and/or verify subsurface metallic objects. This data is then overlayed and compared with existing site plots (as builts) that record known utilities, storage drums, etc. This combined information minimizes the potential for damaging the penetrometer probe and subsurface objects. Using this information, potential penetrometer push points are established and then accurately determined using a real-time global positioning system. This data is then integrated with the respective sounding data collected for each penetrometer cavity. In total, this will accurately estimate the location and extent of POL contamination at each site.

1.10 Decontamination Decontamination is the process of neutralizing or removing contaminants from equipment or personnel. SCAPS does not bring a significant amount of soil to the surface during penetrometer operations. However, decontamination of the rods is required and is accomplished during the pull cycle. As the rods are withdrawn, they are scraped and cleaned by a hot water, high pressure system attached to the bottom of the van prior to entering the hydraulic control room. The water and waste are vacuum removed from the cleaner and stored in 55 gallon drums; pending proper disposal by the local site activity.

Personnel will wear personnel protective equipment (PPE) as defined in the health and safety plan (HASP) generated for each site. It is anticipated that the "lowest level" of PPE will be required for SCAPS' operations. Disposable or contaminated PPE will be collected daily, stored in 55 gallon drums and disposed of as municipal waste.

1.11 Backfilling SCAPS is equipped to seal each penetrometer cavity at the conclusion of each push. The holes are sealed using a cement/bentonite/water/ Sikament 10 ESL grout mixture. The grout is pumped by a high pressure, progressive cavity pump through a tube running down the middle of the penetrometer rods. At hole depth, the pump pressure expels a sacrificial tip. The grout fills the cavity as the rods are pulled upward and withdrawn.

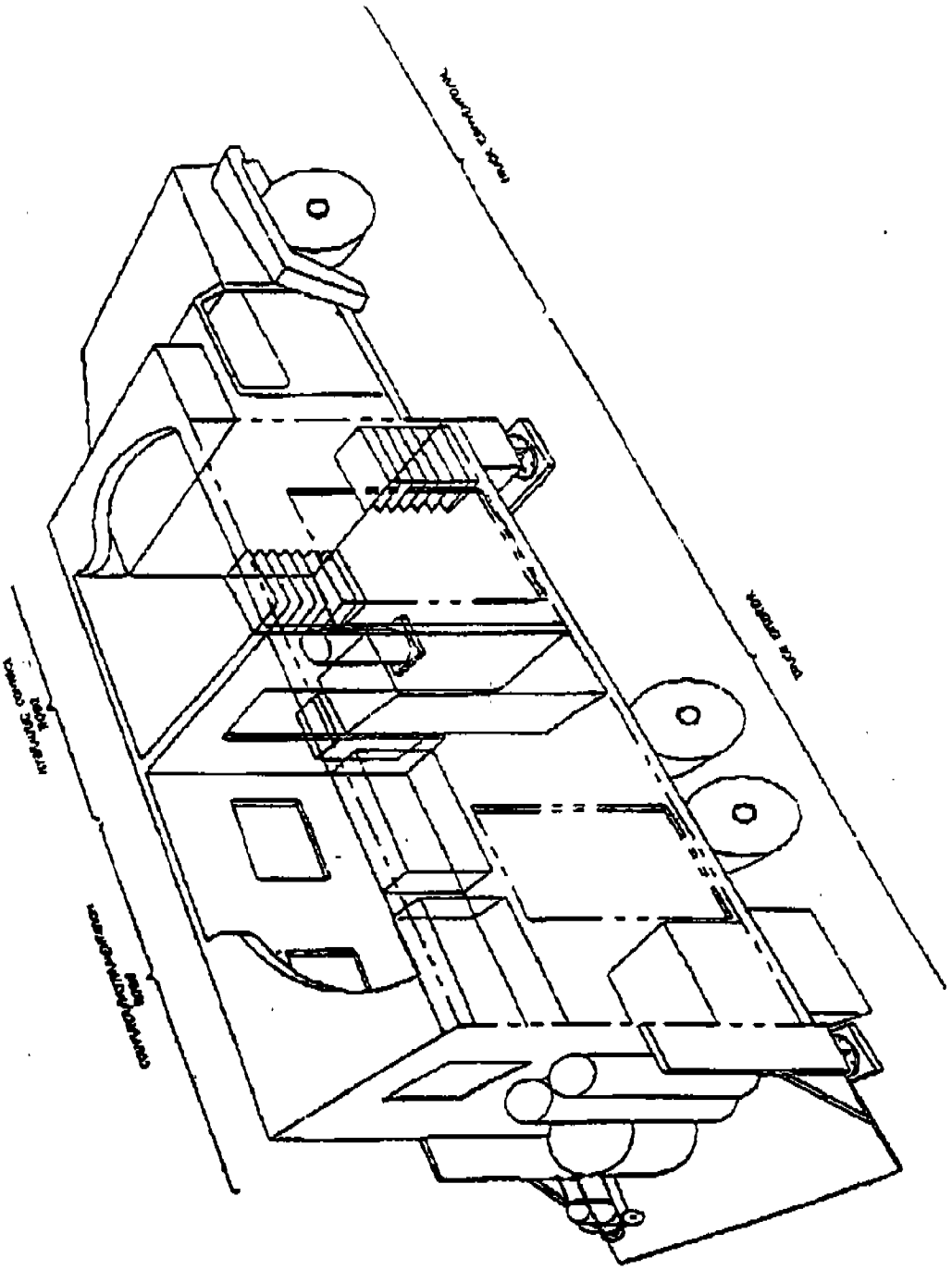


Figure 1. SCAPS

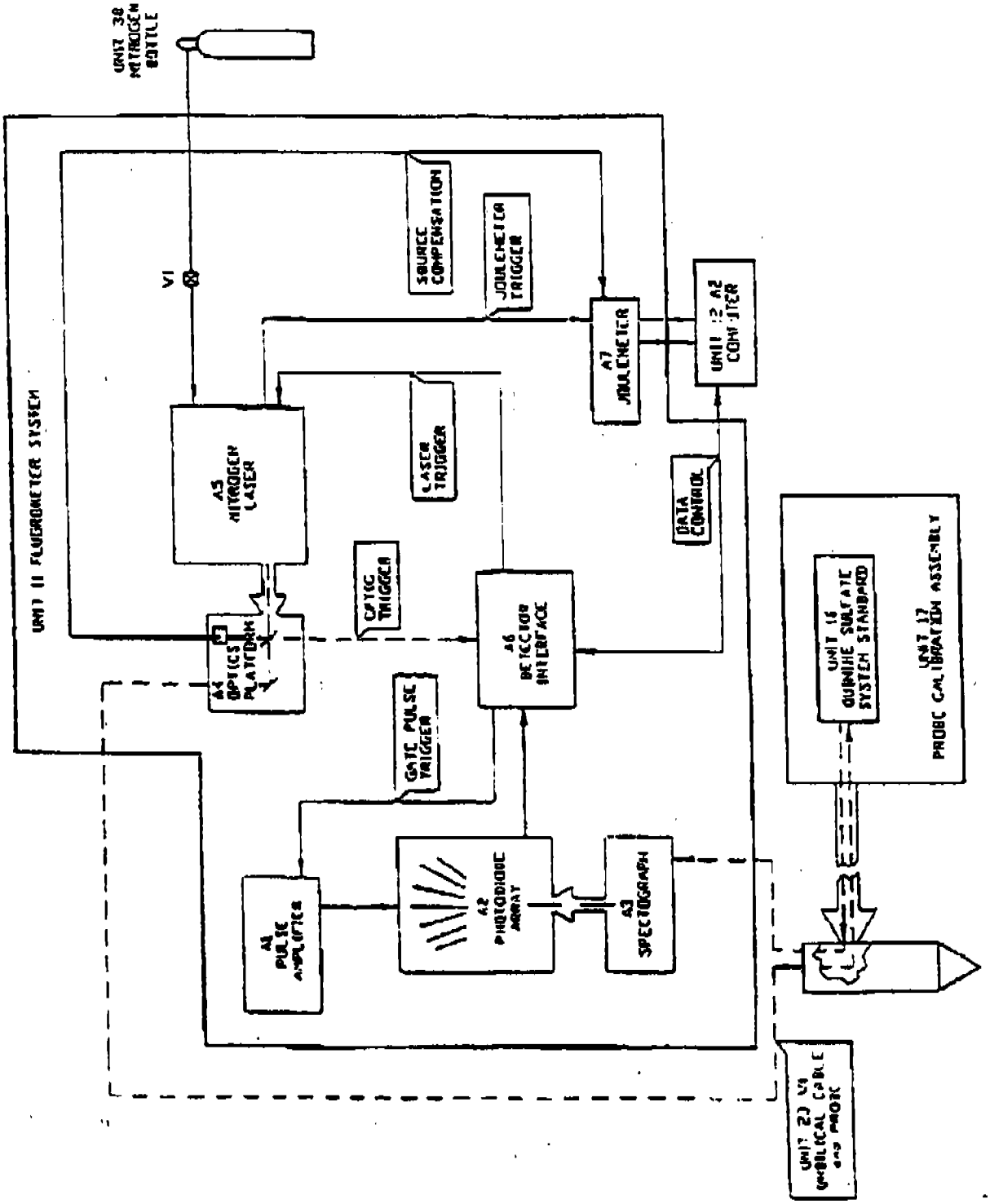


Figure 4. FLUOROMETER SYSTEM

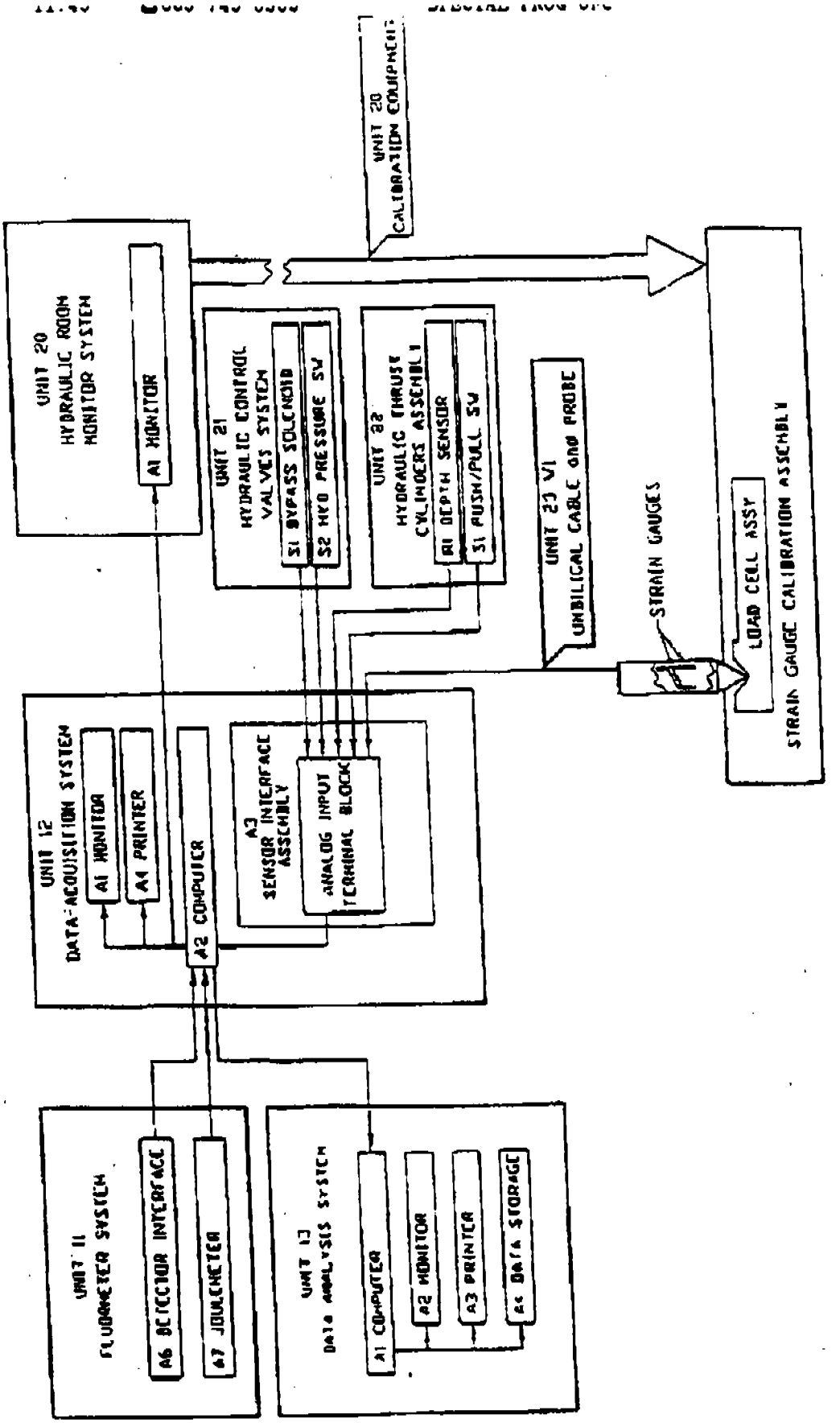


Figure 5. DATA INTEGRATION

APPENDIX B-2

TERRAPROBE℠ TOOLS DESCRIPTION

The Screen Point Sampler
GW-440K

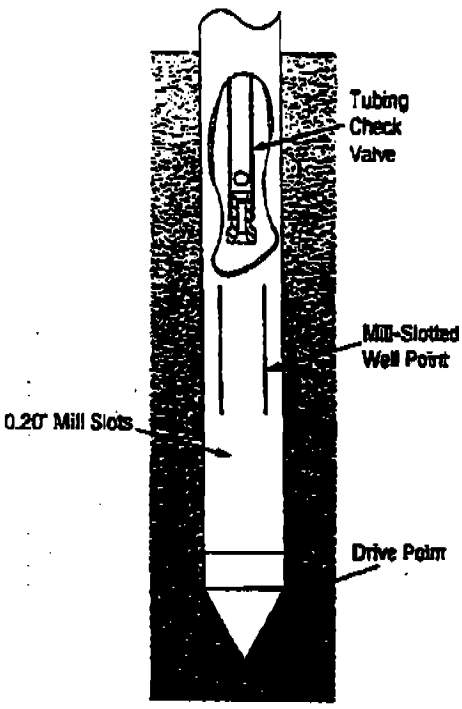
Free drainage type water sampler. Complete description, instructions, and parts are shown on pages 5.2 to 5.8.

- Geoprobe Systems' most popular water sampler.
- Sampler remains sealed while being driven to depth.
- Stainless steel screen filters out sediment.
- Use for sampling or piezometric measurements.
- Can be used in aquifers with low transmissivity.

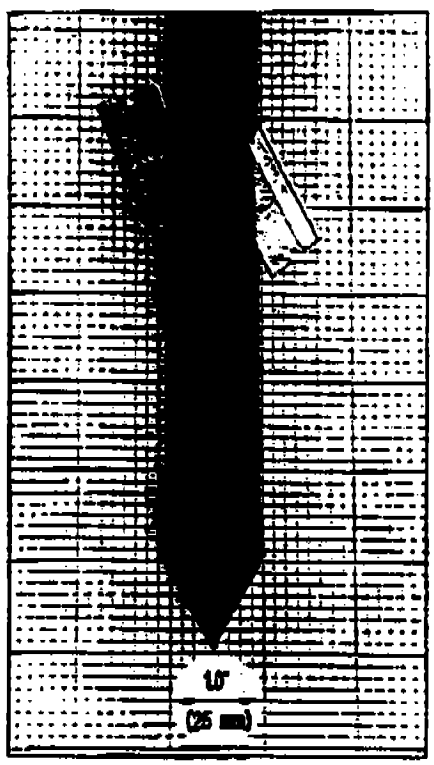
Mill-Slotted Well Point
GW-43K

Alloy steel construction. Parts and description shown on page 5.9.

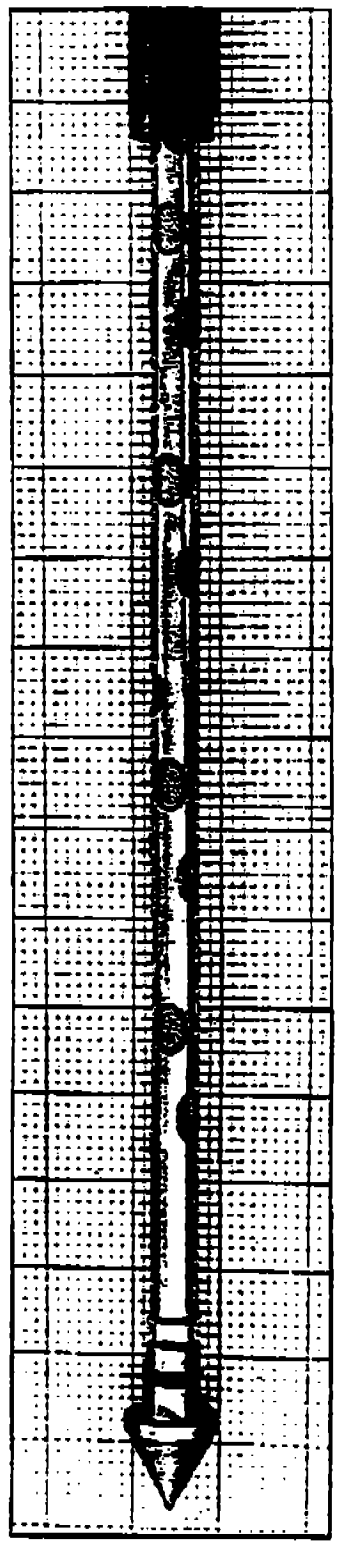
- Open slotted design with .020" mill cut slots.
- May be driven or lowered from ground surface.
- Recommended for use in sand aquifers.



Cross-sectional view of GW-43K using tubing to collect a sample.



The GW-43K Mill-Slotted Well Point.



GW-440K Screen Point Sampler.

Geoprobe Screen Point Ground Water Sampler

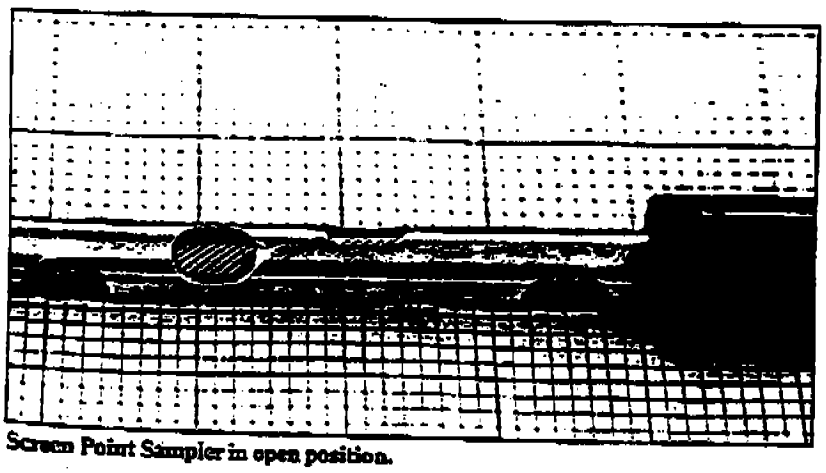
GW-440 Series

This sampler allows the user to drive a sealed stainless steel screen to depth, open the screen, and obtain a water sample via a tubing system to the surface. It features a 19" screen encased in a perforated stainless steel sleeve. The screen section remains totally enclosed in a sheath until it is pushed out into the formation at the desired depth. Flexible tubing can be connected to the top of the screen section using PRT adapters (Note: See the PRT sampling system on pages 3.2 to 3.6 for an explanation and available tubing and adapter sizes.). Water samples can be bailed from the rod bore or pumped directly from the screen section using a peristaltic pump.

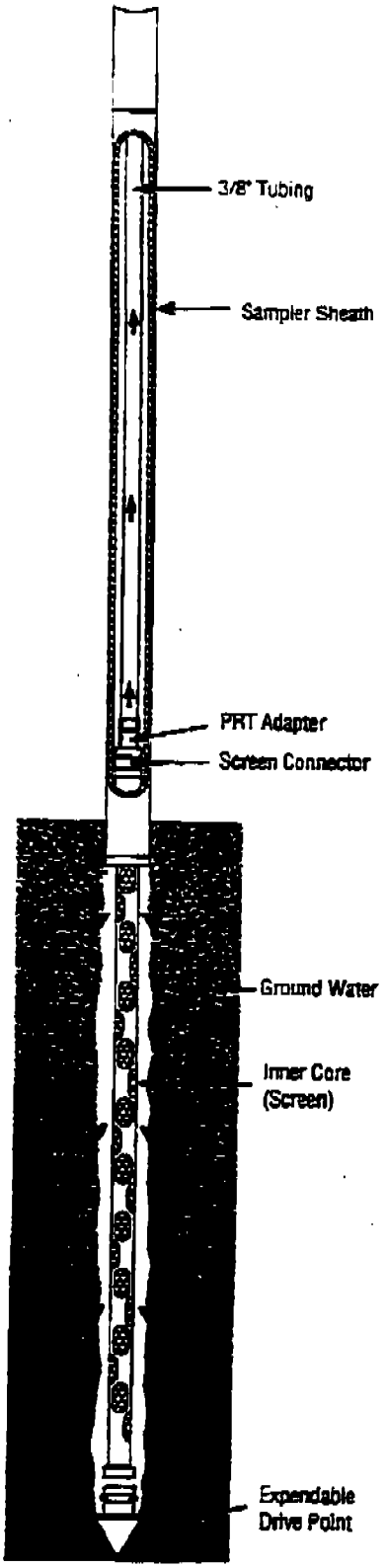
This sampler is easily disassembled for cleaning. The sampler screen section is inexpensive and easily replaced.

The assembled Screen Point Sampler is 1.0" O.D. x 36" overall length and threads onto the leading probe rod. The device is also useful for measurement of piezometric levels.

- Stainless steel inner core and screen
- .0057" (.145 mm) pore size screen filters out sediment
- Simple design disassembles easily for cleaning
- Sampler remains sealed while being driven to depth
- Use for piezometric measurements
- Use for screening of contaminants
- Sample at discrete depths within formations
- Allows the pumping of multi-liter sample volumes.



Screen Point Sampler in open position.



Extended Page

GROUND WATER SAMPLING TOOLS - Screen Point Sampler - Operation

Basics

While the Screen Point Sampler is being driven to the desired sampling depth, it is kept sealed by o-ring connections placed at critical locations on the assembly. When the desired sampling depth is reached, the sampler is pulled up about 2 feet which disengages the expendable drive point and creates an open borehole from which to sample. The inner core, which consists of a stainless steel wire screen inside of a perforated stainless steel sleeve, is then pushed out into the borehole and water is allowed to enter the sampler. A ground water sample can then be collected.

Parts

Geoprobe prove rods and driving accessories and the following tools are required for operation:

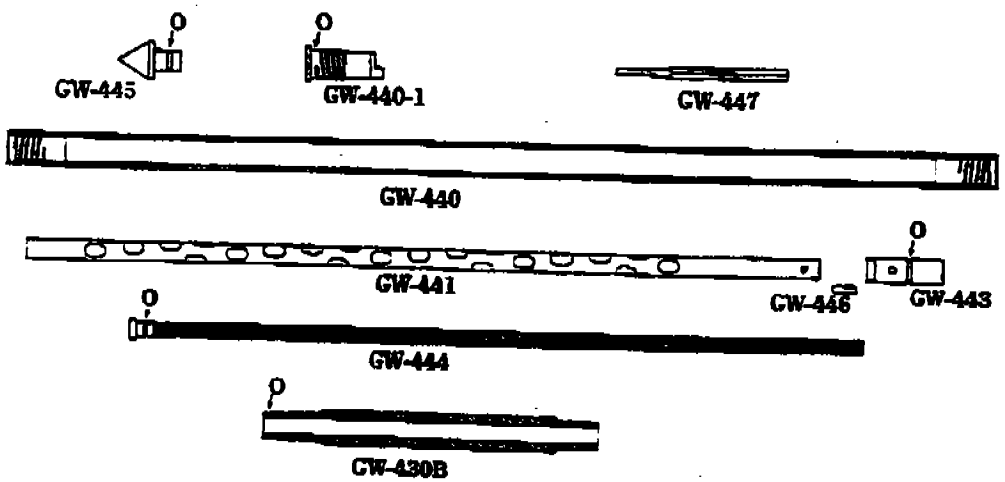
- Assembled Screen Point Sampler
- Extension Rods (sufficient to reach sampling depth)
- Extension Rod Couplers
- Extension Rod Handle

For Sample Collection

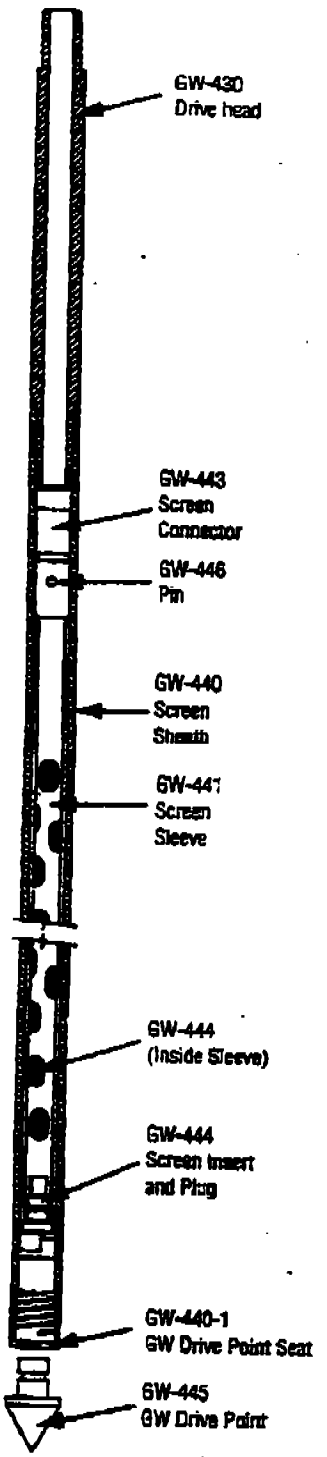
- 3/8" Tubing
- Bottom Check Valve

or

- Selected Tubing
- PRT Tubing Adapter
- Peristaltic Pump



O = O-ring location



Cross-Sectional View of assembled GW-440K.

Geoprobe Systems

Assembly

Clean all parts thoroughly before assembly. An uncontaminated screen insert should be used for each new sample. It is recommended that new o-rings be installed at each o-ring location prior to each sample. O-ring numbers correspond to the individual part numbers. After o-rings have been installed, follow these steps:

1. Push the Screen Insert and Plug into the Screen Sleeve from the bottom. The bottom end has one drain hole. (**Figure 1.**)
2. Push the Screen Connector over the top end of the Screen Sleeve and push the Screen Connector Pin into place. (**Figure 2.**) It has a loose fit so use your thumb and forefinger to hold it in place.
3. Insert the Screen Sleeve, Screen Connector first, into one (either is OK) end of the Sampler Sheath.
4. Slide the Drive Point Seat over the end of the screen assembly that protrudes from the Sampler Sheath. (**Figure 3.**) Thread it in until tight using a 7/8" wrench.
5. Push the screen assembly just far enough into the Sampler Sheath that a GW-445 expendable drive point can be pushed into place in the Drive Seat.
   NOTE: GW Expendable Drive Point (Part No. GW-445) must have o-ring attached (Part No. GW-445R).
6. Screw the GW Drive Head with the o-ring end first into the open end of the Sampler Sheath. (**Figure 4.**)

NOTE: These parts must be assembled so as to allow free movement of the screen assembly inside of the Sampler Sheath, there should be no internal binding. The assembled sampler is now ready to be driven into the subsurface.

Figure 1. Pushing the Screen Insert and Plug into the Screen Sleeve.

Figure 2. Pushing the Screen Connector Pin into place.

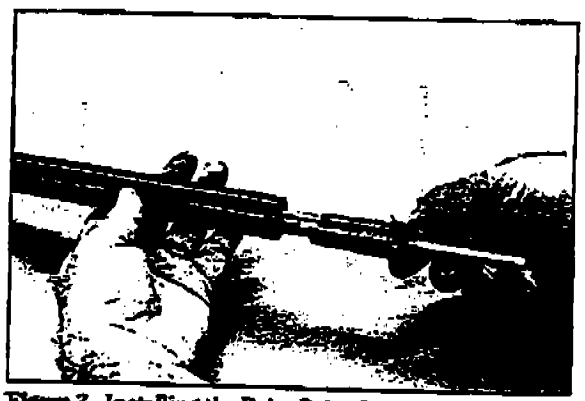
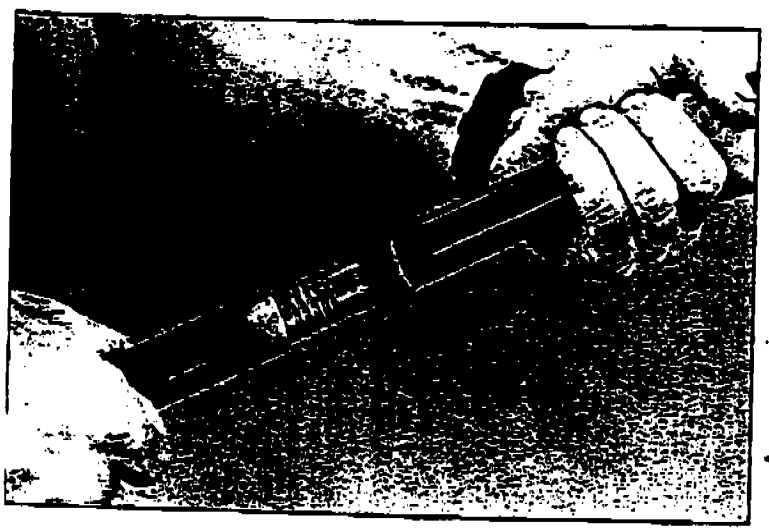


Figure 3. Installing the Drive Point Seat.



◀ **Figure 4. Completion of assembly.**

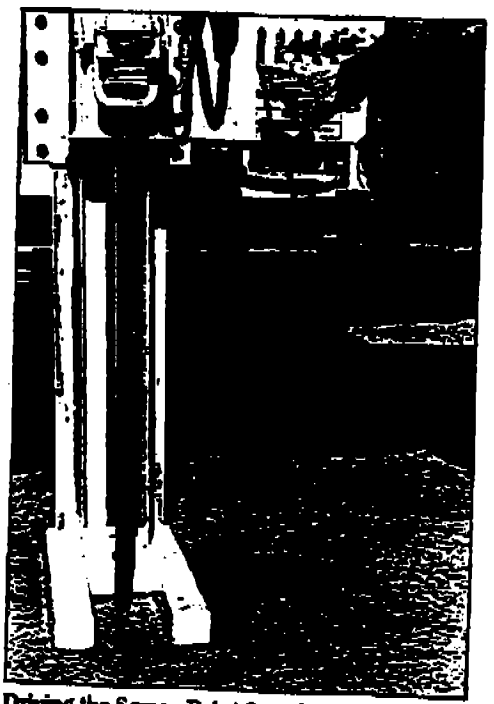
Probing

Place a drive cap on the assembled sampler and drive it into the subsurface. Continue driving by adding Geoprobe probe rods until the sampler tip has been driven about one foot below the target sampling depth. Once that depth has been reached, disengage the expendable drive point by pulling the rods back a distance of about 2 feet.

Exposing Screen

In stable formations, the screen assembly may be pushed out into the open borehole by lowering 3/8" tubing affixed with a PRT adapter (Part Nos. TB-25L, PR-25S) to the top end of the screen assembly. The threads on the PRT adapter are engaged with the threads on the Screen Connector by pushing gently downward on the tubing and rotating it counter-clockwise. When properly connected, the Screen assembly can be pushed out of the Sampler Sheath by pushing down on the tubing. A water sample can be drawn through the tubing.

In unstable formations, the screen assembly may have to be pushed out of the Sampler Sheath by means of extension rods inserted down the inside of the probe rods. The end of the rods should be equipped with an extension rod coupler (Part No. AT-68) to protect the threads on the Screen Connector. A steady push is sufficient, excessive hammering on the rods should be avoided. (**Figure 5.**) After pushing the screen into the formation, the extension rods need to be removed in order to begin sampling.



Driving the Screen Point Sampler with a Geoprobe 8-M machine.

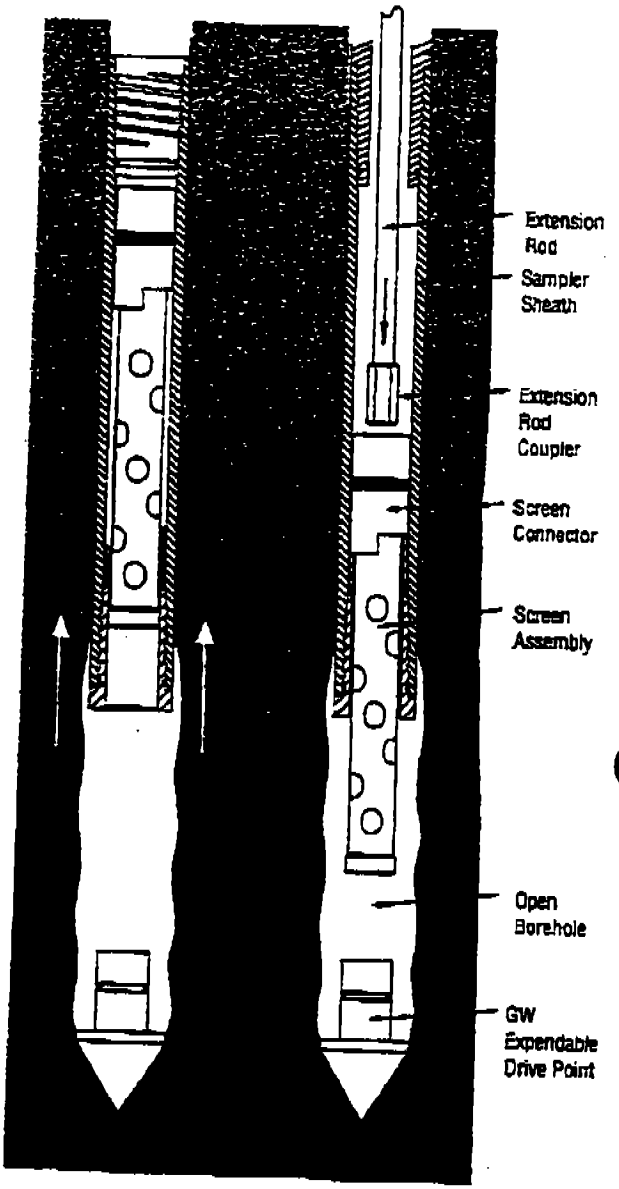


Figure 5. Pushing out the screen assembly with extension rods. (Not drawn to scale.)

Sampling

Water sampling may be accomplished by using 3/8" tubing and a stainless steel PRT adapter as previously described (Part Nos. TB-25L, PR-25S). Once the PRT adapter has made connection with the Screen Connector, a vacuum may be applied to the top of the tubing. **(Figure 6.)** This may be done with a peristaltic pump or by using a vacuum pump with an in-line trap.

If the PRT system is not used, the same tubing equipped with a bottom check valve (Part No. AT-42) may be used. The tubing is oscillated up and down and the water sample is pushed upward into the tubing as the ball repeatedly lifts and seats. **(See also Figure 6.)** The tubing will begin to feel heavier as it fills with several feet of water. It can then be lifted out of the probe rods, cut, and the water poured into a vial for analysis. This same tubing/check valve arrangement has been used to pump multi-liter samples from the probe rod.

Removal

When the sampling procedure is finished, the probe rods and sampler may be extracted. If the PRT system is used, remove the tubing by pulling up firmly on it until it disconnects from the PRT adapter down-hole. The PRT adapter will remain attached to the Screen Connector.

After the sampler has been recovered, examine all parts for wear, damage, or contamination. Clean all parts thoroughly, replace the o-rings, and prepare for the next sample.

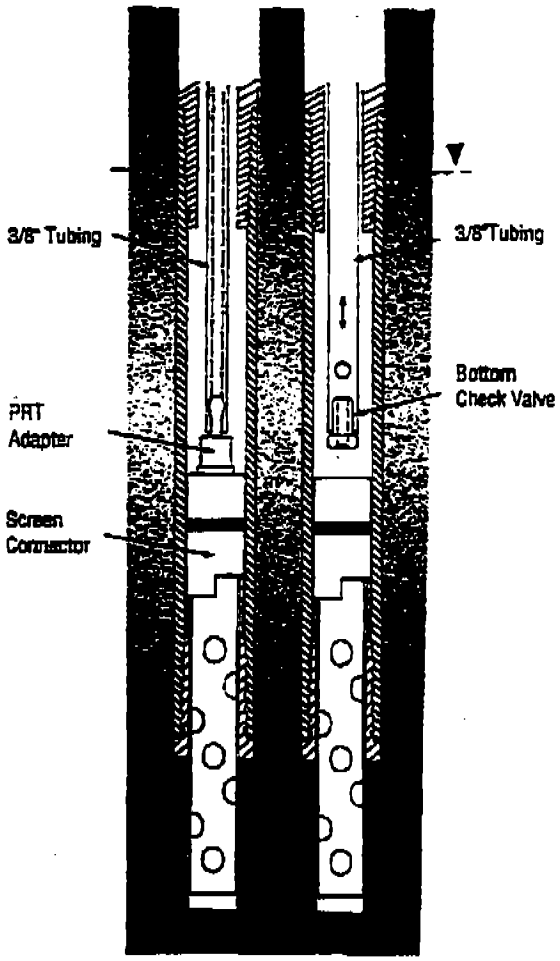
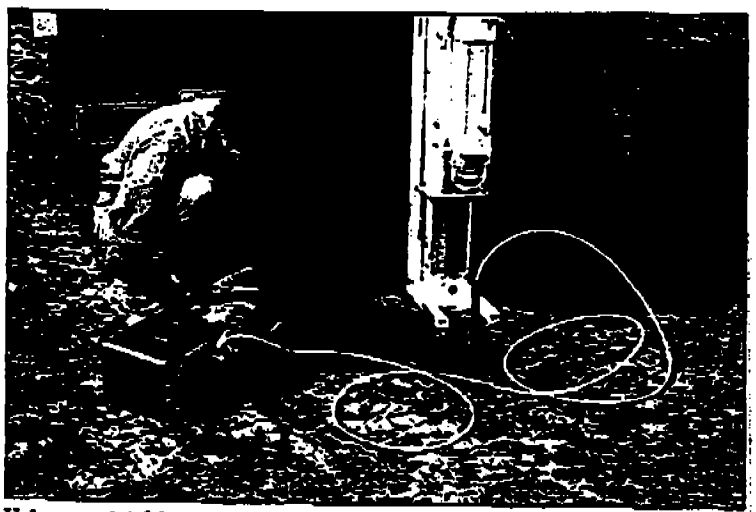
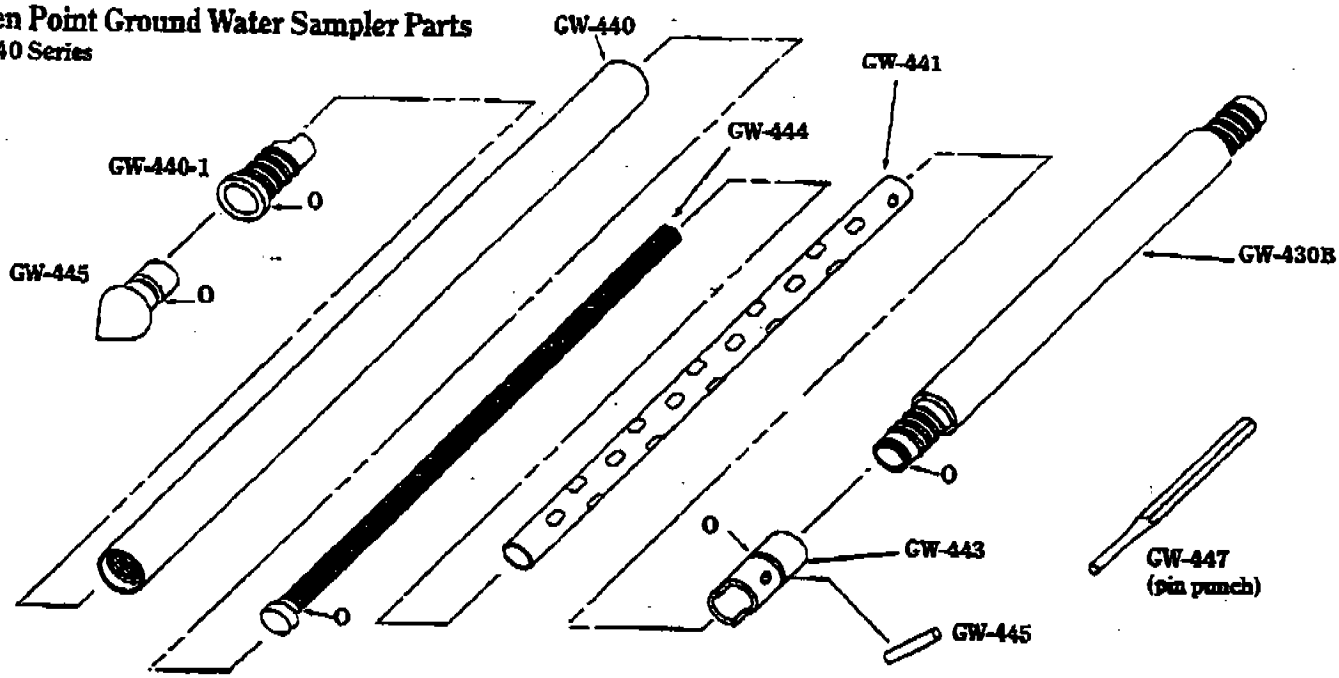


Figure 6. Sampling options.



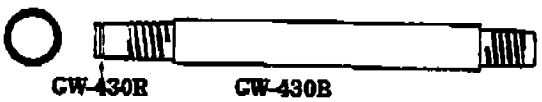
Using a peristaltic pump to collect a ground water sample using the Screen Point Sampler.

Screen Point Ground Water Sampler Parts
GW-440 Series



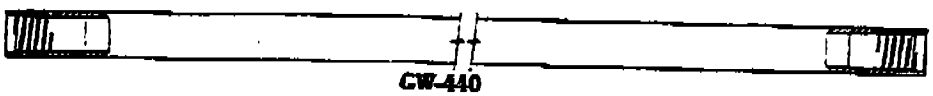
O = O-ring location

Ground Water Sampler Drive Head
Part No. GW-430B
8.5" long x 1.0" I.D., 0.5" I.D.. Alloy Steel.
Geoprobe "B" thread.



GW Sampler Drive Head O-Rings
Part No. GW-430-R
Fits groove at end of threads on drive head.
Package of 25.

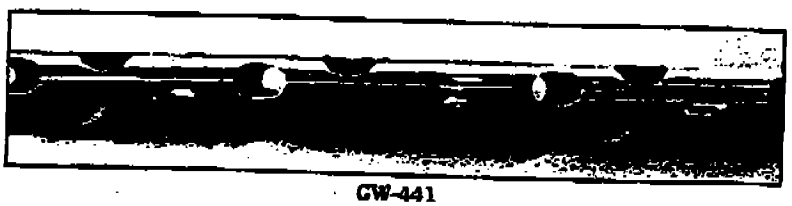
Screen Point Sampler Sheath
Part No. GW-440
Alloy Steel. 27" long x 1.0" O.D., 0.76" I.D.
Corrosion resistant finish.



GW Drive Point Seat
Part No. GW-440-1
Fits end of Sampler Sheath. Holds expendable drive point in place.

GW Drive Point Seat O-Rings
Part No. GW-440-1R
Fits groove on drive point seat. Package of 25.

Screen Sleeve
Part No. GW-441
Stainless Steel. 22.7" long x 0.56" O.D., 0.44" I.D.



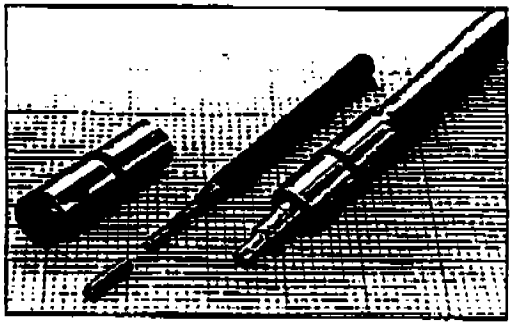
GROUND WATER SAMPLING TOOLS - Screen Point Sampler - Parts

Screen Connector
Part No. GW-443
Stainless Steel. Top end has left-hand threaded PRT fitting.

Screen Connector O-Ring
Part No. GW443R
Fits groove on Screen Connector. Package of 25.

Screen Connector Pin
Part No. GW-446
Stainless Steel. Holds Screen Connector in place.
Package of 5.

Screen Connector Pin Punch
Part No. GW-447
Used for installation and removal of screen connector pin.



Bottom end of Screen Connector showing o-ring and pin location (left). Top end of GW-443 showing PRT adapter and fitting (right). GW-447 Pin Punch (center).

Screen Insert and Plug
Part No. GW-444
Wire mesh stainless screen 22.25" overall length with welded stainless steel plug. Fits inside of Screen Sleeve. .145 mm pore size, .375" O.D.

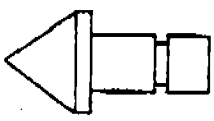
GW-444 Screen Insert with Plug and o-ring.

Screen Insert Plug O-Ring
Part No. GW-444R
Fits plug on screen insert. Package of 25.

GW Expendable Drive Point
Part No. GW-445
Steel. 1.1" Maximum O.D., .625" O.D. shaft.

GW Drive Point O-Rings
Part No. GW-445R
Fits Groove on GW drive point. Package of 25.

OPTIONAL PARTS	
PR-25S	Post Run Tubing Adapter (see page 3.5)
TB-25L	3/8" x 1/4" Polyethylene Tubing (see page 5.10)
GW-41	Stainless Steel Mini-Bailer (see page 5.11)
GW-42	Tubing Bottom Check Valve (see page 5.10)



GW-445

GW-445R

KITS

Assembled Screen Point Ground Water Sampler
Part No. GW-440K
Includes the following parts:

(1)	GW-430B	GW Sampler Drive Head	(2)	GW-444	Stainless Screen Insert and Plug
(1)	GW-440	GW Sampler Sheath	(25)	GW-445	GW Expendable Drive Point
(1)	GW-440-1	GW Drive Point Seat	(1)	Complete Set of O-rings. 25 each of: GW-430R GW-443R GW-445R GW-440-1R GW-444R	
(1)	GW-441	Screen Sleeve			
(1)	GW-443	Screen Connector			
(5)	GW-446	Screen Connector Pin	(1)	GW-447	Screen Connector Pin Punch

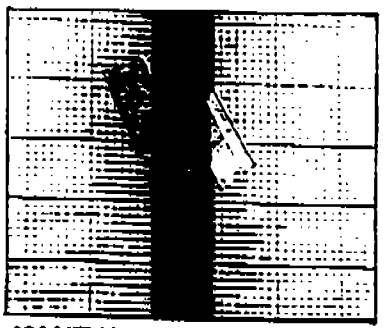
GROUND WATER SAMPLING TOOLS - Mill-Slotted Well Point

Mill-Slotted Well Point

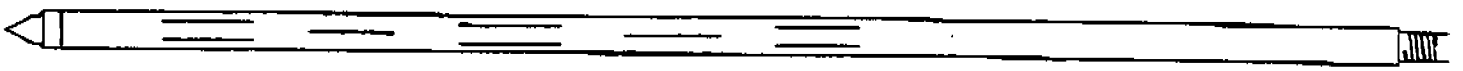
GW-40 Series

Threads into leading Geoprobe probe rod. 36" long x 1.0" O.D. Slotted section is 24" long x .76 I.D. and has 15 mill-cut slots, each 2.0" long x .020" wide. This open slotted tool is driven or lowered from the ground surface into the water table. An inner tubing or smaller diameter bailer is inserted down the inside diameter of the probe rods to collect a water sample as shown on page 5.1.

The 24" long slotted sections (GW-44) may be coupled together with mill-slotted rod couplers (GW-45) to increase the surface area exposed to the slots. This tool works best in sandy aquifers and is not recommended for use in silty, clay-rich soils. A larger diameter pre-probe (AT-146B) may be driven ahead of the slotted section and is often used with this tool to minimize clogging of the mill slots.



.020 Mill Slot for Ground Water Sampling.



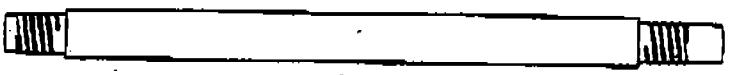
GW-43K
(Assembled Sampler)

Parts

Mill Slot Drive Head

Part No. GW-43B

Geoprobe alloy steel. 12" long x 1.0" O.D., 0.5" I.D., B threaded, male both ends.

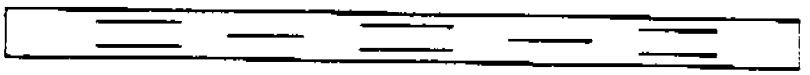


GW-43B

Mill-Slotted Rod Section

Part No. GW-44

Alloy Steel. 24" x 1.0" O.D., 0.76" I.D., with 15 2.0" x .020" mill cut slots. Female B threaded on both ends.



GW-44

Solid Drive Point

Part No. AT-142B

Hardened Steel. Threads into end of GW-44.

AT-142B

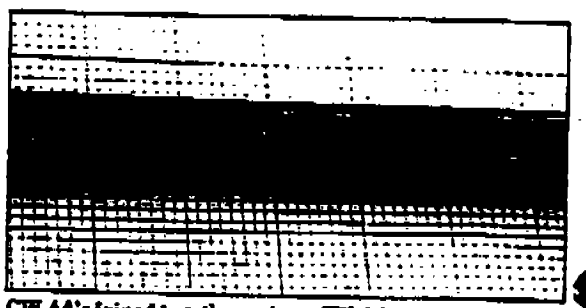
Mill-Slotted Rod Coupler

Part No. GW-45

Used for joining mill-slotted rod sections together. Alloy Steel with flats for attaching a 7/8" wrench.

GW-45

KIT
Assembled Mill-Slotted Well Point Assembly
Part No. GW-43K
Each Kit includes the following parts:
(1) **GW-43B** Mill Slot Drive Head
(1) **GW-44** Mill-Slotted Rod Section
(1) **AT-142B** Solid Drive Point



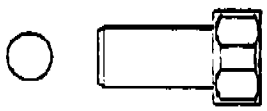
GW-44's joined together using a GW-45.

GROUND WATER SAMPLING TOOLS - Tubing and Check Valve

Tubing Bottom Check Valve

Part No. GW-42

Fits 1/4" I.D. Tubing. Converts standard tubing into a mini-bailer. Oscillating motion pumps water column up into tubing. Can pump water to the surface in some formations. Tubing recovers 9.65 ml per foot.



GW-42

Check Balls

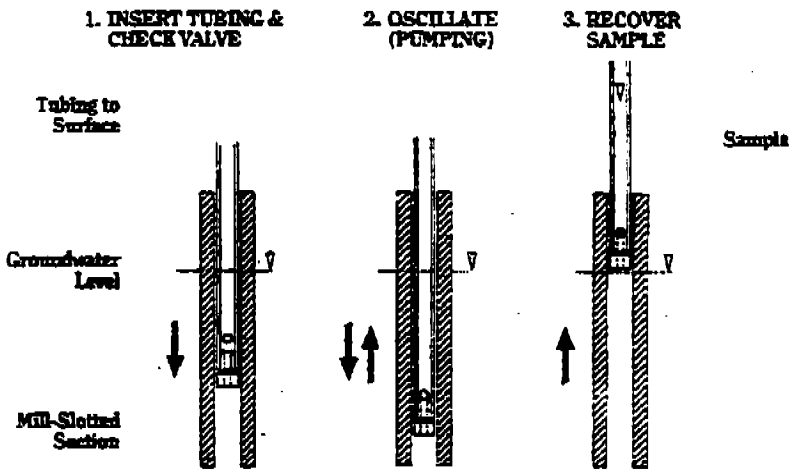
Part No. GW-42-1

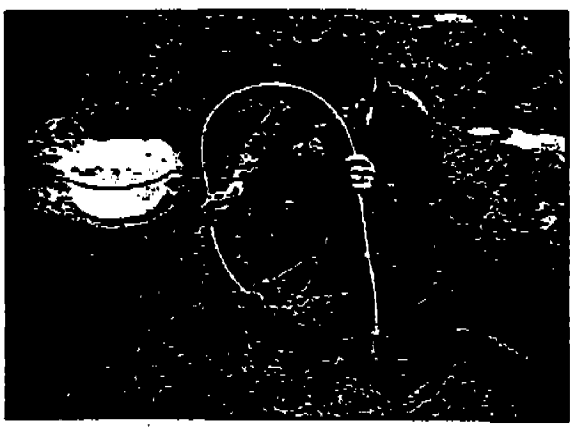
Replacement check balls for GW-42. Package of 25.

How well does it work?

Tests in a sandy aquifer recovered 0.5 liters of water per minute from a depth of 25 feet using 1/4" I.D. tubing and the bottom check valve with the GW-440K Screen Point Water Sampler. A peristaltic pump under the same conditions recovered only 0.1 L per minute.

Groundwater Sampling With Tubing Bottom Check Valve



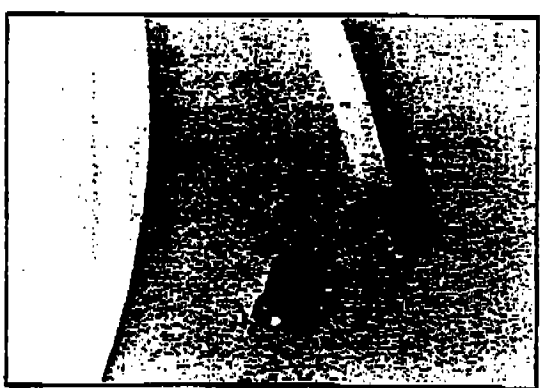


Using TB-25L tubing and the GW-42 bottom check valve to collect a water sample.

1/4" I.D. Polyethylene Tubing

Part No. TB-25L

3/8" O.D. x 1/4" I.D. with .060" wall tubing. For water sampling with the GW-42 tubing bottom check valve. Discard tubing after each sample. 500 ft. roll.

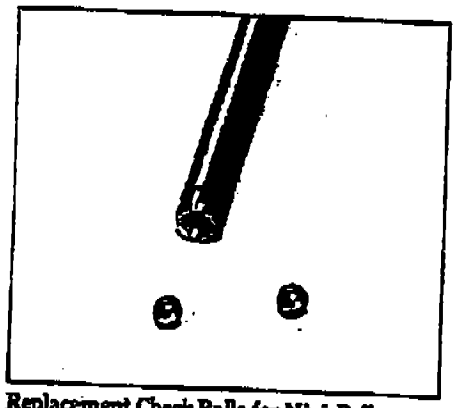


Tubing Bottom Check Valve and 3/8" Polyethylene Tubing.

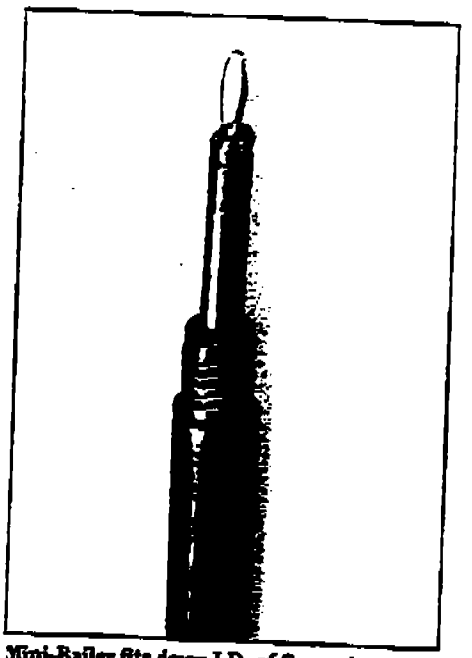
GROUND WATER SAMPLING TOOLS - Geoprobe Mini-Bailer

Well Mini-Bailer
Part No. GW-41
Stainless steel; 20" in length x 7/16" O.D. Fits down I.D. of Geoprobe probe rods. Recovers up to 20 ml of sample.

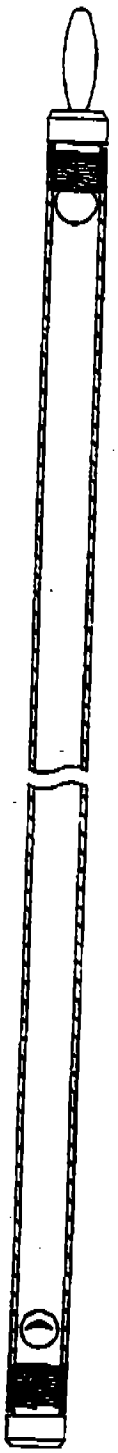
Mini-Bailer Check Ball
Part No. GW-41-1
Replacement check ball for mini-bailer, package of 5.



Replacement Check Balls for Mini-Bailer.



Mini-Bailer fits down I.D. of Geoprobe Probe Rods.

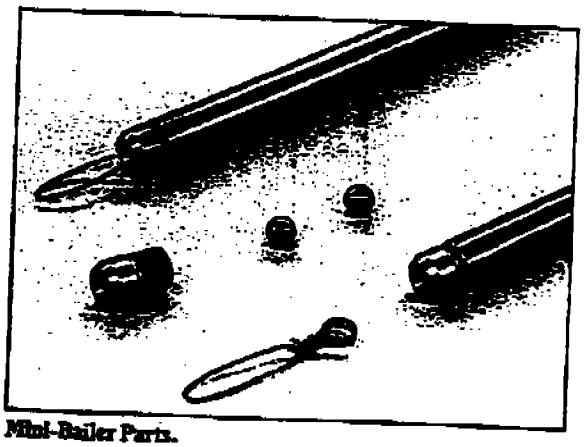


GW-41

Sub-Assembly Parts

Mini-Bailer End
Part No. GW-41-2

Mini-Bailer Wire Hook
Part No. GW-41-3

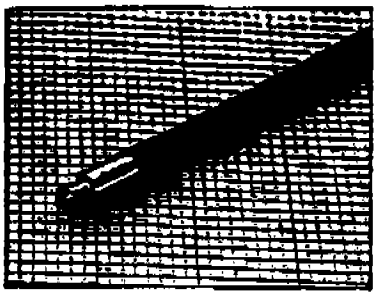


Mini-Bailer Parts.

Post-Run Ground Water Screened Implant

Part No. AT-87-25S

Stainless steel double woven wire screen implant measures 21" long x 3/8" diameter with .145 mm pore openings. Top end has barbed fitting that attaches to TB-25L 3/8" tubing. Bottom end has a PRT fitting that threads into PR-14 Implant Anchor. Installation is accomplished in similar fashion to permanent vapor implants. (See page 5.11.) Used for installing permanent ground water monitoring points. Tubing is attached to a peristaltic pump to recover samples.



◀ **PRT (bottom) end of GW Screened Sampling Implant.**

AT-87-25S

Sparging

The AT-87-25S Screened Implant may also be used for sparging. The screen is installed in the same fashion as soil gas implants, typically several feet below the water table. Bentonite chips or bentonite/glass bead mix may be poured down the hole around the outside of the tubing as a sealing material. Geoprobe Systems' engineers have installed several screens at a depth of 48 to 58 feet in an alluvial setting with the water table at 24 feet. A pressure vs. flow for a sparge point in this setting is shown in **Figure 1.** Typical installation time for installing a sparge point is about 1 hour and 20 minutes.

Geoprobe Air Sparging: Typical Installation

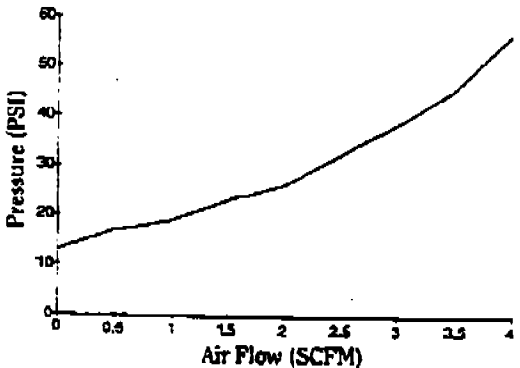
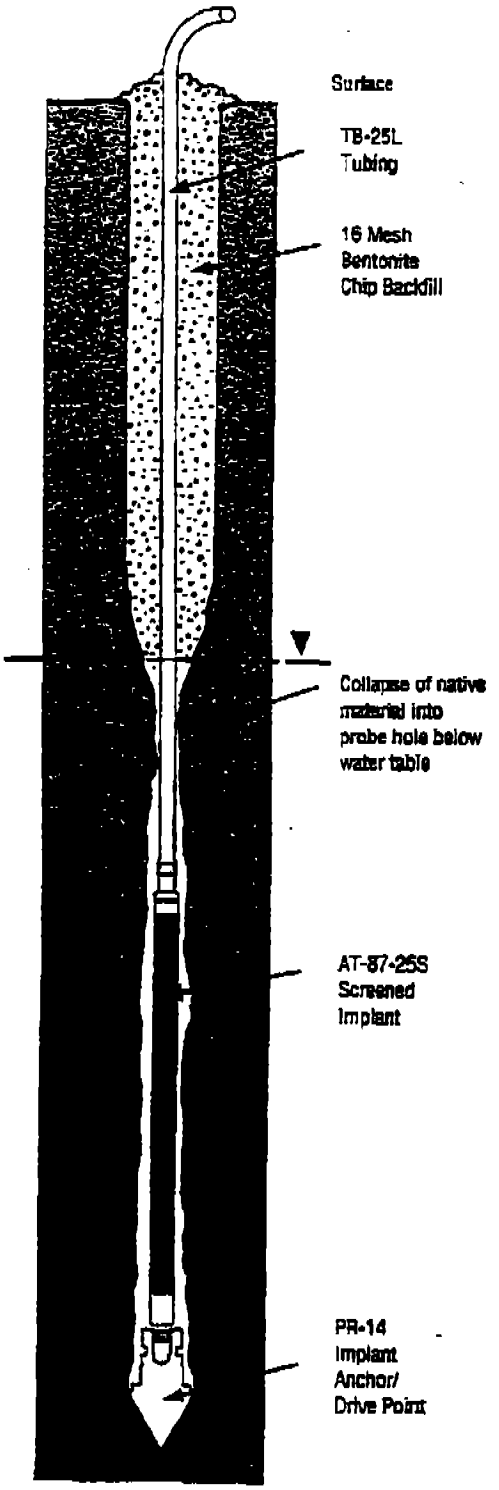


Figure 1. Pressure vs. Flow. AT-87 Sparge Point installed sands at 56-58 ft, W.T. at 24 ft.

Other top fittings are available to fit various sizes of tubing. Please call for availability.

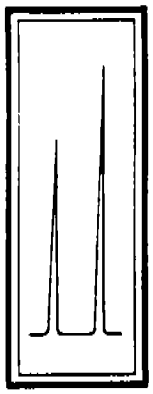


An installed implant.

APPENDIX C

TRACER GAS INFORMATION

Tracer Research Corporation



VAPOR TRACE ®
SOIL GAS INVESTIGATIONS

VAPOR TRACE ADVANTAGES

- Fastest, least disruptive and most economical method for detecting and evaluating site contamination from petroleum hydrocarbons and other volatile organic compounds.
- On-site sampling and analysis of volatile contaminants using laboratory grade analytical equipment and quality assurance.
- Multiple depth sampling capability.
- On-site identification and mapping of contaminant plumes to minimize unnecessary sampling in uncontaminated zones. Rapid location of contamination sources and hot spots.
- On-site computer printout of all data.
- Specially developed QA/QC procedures accepted by the EPA for use on Superfund sites, are followed on all jobs.

Setting the Standard in Soil Gas Investigations & Leak Detection Services

Tracer Research: Superior Quality Detection Technologies

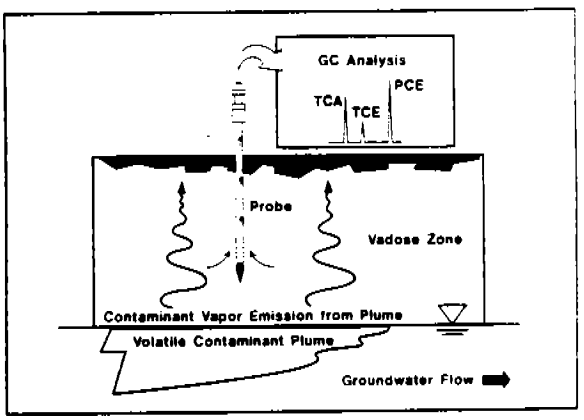
VAPOR TRACE SOIL GAS SURVEYS

Vapor Trace soil gas investigations measure the extent of subsurface contamination in soil and groundwater from volatile organic chemicals (VOCs) such as chlorinated solvents and petroleum products.

Samples can be collected at industrial sites, gasoline stations, or hazardous waste sites without unnecessary disruption. They can be collected in urban areas, along city streets, sidewalks and residential neighborhoods without attracting undue attention.

VAPOR TRACE METHOD

A self-sufficient, mobile laboratory van and two-person scientific crew will come to your site to obtain samples. They will evacuate a small amount of soil gas from the soil through a hollow probe hydraulically driven into the ground.



The sampling operation is quick, unobtrusive and produces a small hole that is readily patched. No cuttings are generated.

The soil gas samples are immediately analyzed for the presence of contamination from VOCs by highly sensitive gas chromatographs. 15 to 25 samples can be collected and analyzed in a day at most sites.

Contaminants are identified and quantified, sources are located and contaminant distributions are mapped.

At the end of each day a condensed data package is presented to the client. By providing clients with this information directly at the site, the need for other investigative procedures can be quickly evaluated.

THE VAPOR TRACE SOIL GAS SURVEY ENSURES FAST, NON-OBTRUSIVE SOIL AND GROUNDWATER INVESTIGATIONS

VAPOR TRACE ADVANTAGES OVER DRILLING INVESTIGATIONS

- More can be learned about the contaminant distribution at a Vapor Trace soil gas survey in one day than conventional drilling and sampling techniques can provide in weeks.
- The cost for a one-day soil gas survey of 15-25 points costs less than installing one 4-inch diameter PVC monitoring well to a depth of 40 feet.
- Most industrial sites, landfill areas or other properties of 10 acres or less can be screened in 2 to 3 days.
- In areas where the depth to water is 50 feet or greater, the cost savings increase exponentially.
- When drilling is specified or required, soil gas site surveys are an excellent screening tool to help determine the optimal placement of monitoring wells.
- Soil gas surveys can minimize the number of permanent wells installed, thereby reducing long term monitoring costs.

SOURCE AREA INVESTIGATION

A major application of Vapor Trace soil gas technology is locating contaminant source areas. The fact that numerous samples can be economically collected over a large area increases the possibility of detecting sources that would otherwise go unnoticed. In some cases, Tracer Research has been asked to locate sources of groundwater contamination when the problem could not be solved economically by conventional monitoring technology.

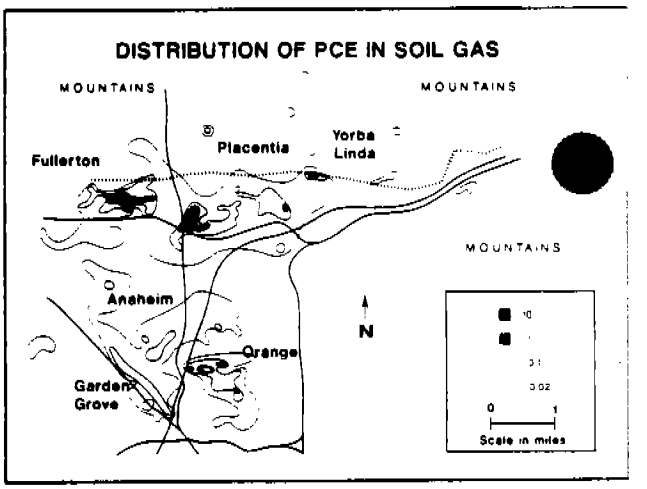
MULTIPLE DEPTH SOIL GAS SAMPLING

Typical depths for sampling range between 5 and 21 feet below ground surface. These depths can be sampled using the mobile laboratories which contain the equipment necessary to collect and analyze soil gas samples on-site.

A custom built Tracer Research Deep Probe Sampling device (DPS 550) was designed to collect soil gas samples up to 100 feet below ground surface. The DPS 550 is accompanied by a mobile laboratory to analyze the samples on site.

BROAD AREA SOIL GAS SITE SURVEYS

Tracer Research is the industry leader in conducting broad area surveys. Soil gas surveys are particularly beneficial for urban areas when municipal wells are contaminated by solvents. They are a cost effective and non-disruptive method for conducting investigations on public property and highways.



Tracer Research placed 1,500 soil gas probes in an area 12 miles long by 9 miles wide. Maps developed for each chemical compound showed broad areas of chemical contamination and general source locations. Planners used this information to located future monitoring wells and determine what portions of the water supply were most threatened by the encroaching contamination.

These large-scale investigations are typically undertaken where it is necessary to identify and quantify VOC contamination and map its distribution. In many cases, the identified contamination plumes will help locate and identify the sources potentially responsible for contaminating wells or other groundwater resources. The investigation may also identify wells that may be impacted by contamination in the future.

Tracer Research Corporation

3755 Nort

02) 888-9400

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E

New Jersey
(908) 274-1866 (510) 654-0714 (210) 366-6623

; Serving Europe:
Italy
(0644) 273036 (055) 443335

Implementing Vapor Trace® Express Soil Gas Survey

Tracer Research Corporation

Your Equipment
Your Personnel

Our Container
Our Analysis

Your Savings

- Inexpensive Alternative to On-Site Laboratory Soil Gas Surveys
- Laboratory Gas Chromatographic Analysis
- Low Detection Limits
- Collect 30 or More Samples Per Day
- Easy to Use and Easy to Ship Mini-Canister

Step 1 Select Your Compounds

Service Station List

Benzene
Toluene
Xylene(s)
Ethylbenzene
TVHC

Dry Cleaner List

PCE
TCE
1,1,1-TCA

Real Estate Transfer List

(Combine the Service Station and Dry Cleaner Lists)

Manufacturers List
(Chlorinated Solvents)

PCE
TCE
1,1,1-TCA
1,1-DCE

Paint Factory/Paint Booth List

PCE
TCE
1,1,1-TCA
Benzene
Toluene
Xylene(s)

Automotive Repair/ Engine Rebuilders List

PCE
TCE
1,1,1-TCA
Benzene
Toluene
Xylene
TVHC

Detection Limits for Most Compounds Are Equal to 0.1 µg/L.

These are suggested compounds. Additional compounds may be added, but the cost per analysis may increase for selected compounds or for very broad suites of analytes.

Step 2 Select The Sampling Locations

Considerations in Selecting the Number of Samples

- Distance between sample locations is typically equal to, or less than, the depth to groundwater
- A sampling depth of five to seven feet is suitable for most sites
- A two man crew hand-pounding probes to a depth of five feet can typically collect 30 to 40 samples per day in most soils
- Mechanically assisted probe installation will generate even more samples

Step 3 Select A Method for Installing Probes

Install Probes by Hand:

- Use your own soil gas sampling kit
- Rent or buy one from Tracer Research

Install Probes Mechanically:

- Tracer Research probe drivers
- Drill rigs or cone penetrometers
- Fence post installers
- Geoprobes®

Tracer Research Corporation

37 8-9400

Annapolis Office:
(410) 263-5605

Step 4 Collect the Samples

The Vapor Trace® Express (VTE) Box Will Include:

- VTE Mini-Canisters
- Instructions that detail sample collection with the VTE Mini-Canisters
- Supplemental sampling materials for use with VTE Mini-Canisters
- Quality Assurance Mini-Canisters:
  Trip Blanks — One per day*
  Sampling System Blanks — One per 20 samples*
  Ambient Air Blanks — One per 20 samples*

* There is no fee for Quality Assurance samples at these frequencies

Step 5 Label and Ship the Samples to Tracer Research

The VTE Box Also Includes:

- Labels and Chain of Custody forms
- Prepaid shipping materials for shipment to Tracer Research's soil gas laboratory

Step 6 Analysis by Tracer Research Laboratory

The Laboratory Will:

- Analyze Samples within five days of collection
- Send the results of your soil gas and Quality Assurance samples Via FAX and regular mail

Additional Services Offered by Tracer Research Corporation:

Contour Mapping

GC/MS Analysis

On-Site Sampling

On-Site Analysis

Call Us To Help You Design Your Soil Gas Survey!

(800) 394-9929

TRACER RESEARCH CORPORATION

METHOD TO-1

Application For Soil Gas Surveys

Sample Collection On Thermal Desorption Tubes

GC/MS Identification And Measurement Of Compounds

* A Recognized EPA Air Analysis Method Applied To Soil Gas
* Provides Independent Confirmation Analysis
* Enables Identification Of Unknowns By Mass Spectrometry

Tracer Research Steps For TO-1 Implementation

* Perform Soil Gas Analysis In The Field
* Locate Hot Spots For TO-1 Confirmation Sampling
* Calculate Sample Size For Each Thermal Desorption Tube From On-Site Field Analysis
* Collect Appropriate Volume Of Sample
* Send Tube To Tracer Research GC/MS Laboratory For Analysis On Ion-Trap Mass Spectrometer

Advantages Of TO-1 Confirmation Sampling

* GC/MS Analysis, Most Reliable Method Known For Identification Of Volatile Organic Chemicals
* Data Confirmation By TO-1 Analysis Suitable For Legal Use
* Highly Cost Effective, Especially In Conjunction With Soil Gas Survey
* Easy Shipping Of Small Sampling Tubes. No Bulky SUMMA Canisters

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TRACER RESEARCH CORPORATION

Tracer Research TO-1 Analysis Will Detect, But Is Not Limited To The Following Compounds:

1,1-Dichloroethene
Methylene Chloride
trans-1,2-Dichloroethene (DCE)
1,1-Dichloroethane

Chloroform
1,1,1-Trichloroethane (TCA)
Carbon Tetrachloride
Benzene

1,2-Dichloroethane
Trichloroethene (TCE)
1,2-Dichloropropane
Dibromomethane

Bromodichloromethane
cis-1,3-Dichloropropene
Toluene
trans-1,3-Dichloropropene

1,1,2-Trichloroethane
Tetrachloroethene (PCE)
Dibromochloromethane
Chlorobenzene

1,1,1,2-Tetrachloroethane
Ethylbenzene
m-Xylene
p-Xylene

o-Xylene
Bromoform
1,1,2,2-Tetrachloroethane
1,2,3-Trichloropropane

Bromobenzene
m-Dichlorobenzene
p-Dichlorobenzene
o-Dichlorobenzene

Tracer Research Corporation 1-800-394-9929

Soil Sampling Services

Tracer Research Corporation

- Rapid Collection of Shallow Soil Samples Without Generating Soil Cuttings
- "Direct Push" Technology Utilizing Hydraulic Field Sampling Vans
- Discrete Soil Samples for Chemical Analysis and Geologic Observation

Sampler Description

The soil samplers are constructed of hardened steel and were specifically designed to be used with the hydraulic driving mechanism installed in each Tracer Research field van.

The design enables:

- Easy removal of the sample liner
- Use of plastic liners to visually observe subsurface lithologies
- Sampling of a wide range of soil types
- Collection of undisturbed samples for chemical analysis

The sample liner is:

- 15 to 24 inches in length by 1 inch in diameter
- Large volume, ≈ 100 - 150 cm^3
- Clear plastic Tenite (cellulose acetate) or brass construction

Operation

The samplers are driven to the sampling depth. The drive rod is then retracted two inches to unlock the plug. The open sampler is then driven into the soil and retrieved.

- 25 to 40 samples per day can be obtained, dependent on soil types and depths
- Multiple samples can be collected from the same bore hole
- The sampler disassembles easily for decontamination between samples

Analytical Options

Each Tracer field van is equipped with laboratory grade analytical instrumention for immediate on-site analysis. This real-time analysis offers the site investigator an on-the-fly sample screening opportunity. Alternatively, samples can be sealed, preserved, and sent to off-site laboratories for analysis

Tracer Research Corporation

375 -9400

Annapolis Office:
(410) 263-5605

Tracer Research Corporation

TRACER TIGHT®
TANK & PIPELINE LEAK TESTS

TRACER TIGHT ADVANTAGES

- No down time. Tests do not require that tanks or pipelines be taken out of service during any testing procedures.
- No requirement to top-off, fill or empty tanks.
- Use with any size tank or pipeline system without loss of sensitivity.
- Tanks containing fuels, lubricants, heating oils, solvents, wastewater, volatile or nonvolatile chemicals and hazardous wastes are easily tested regardless of size or type.
- Locates leak sources to within a few feet, without excavation.
- Tests will verify that new tanks, piping and upgrade equipment are leak free before the installation is accepted by the owner.
- Cost effective subsequent testing and monitoring.
- System may be used for monthly monitoring.
- Exceeds EPA requirements.

DOLLARS AND SENSE

Service interruptions are costly and disruptive to tank owners. It means lost business, not only at the pumps, but from other products and services that may be offered. When there is a leak, the Tracer Tight test can discover it before it becomes a big problem that may lead to expensive remediation and liability expense.

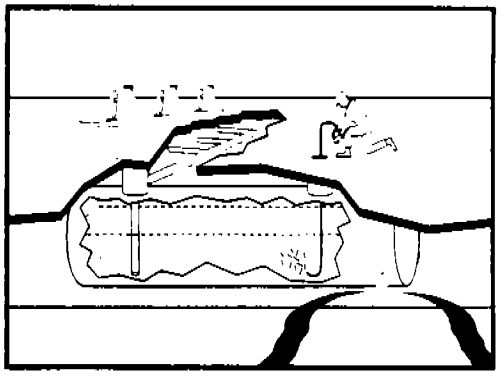
Tracer Technologies:
Superior Quality
Detection Services

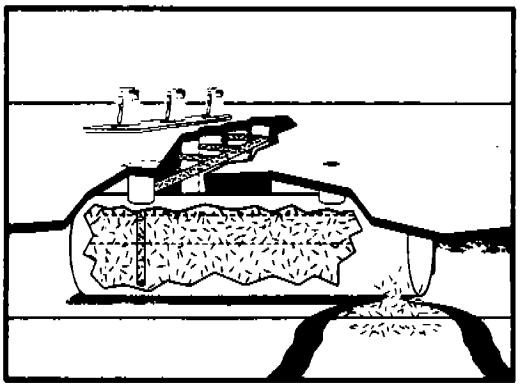
Setting the Standard in
Leak Detection Services
& Soil Gas
Investigations

TRACER TIGHT LEAK TESTING METHOD

Step 1

Leak testing is performed by adding a small amount of a special volatile chemical tracer to the contents of a tank or pipeline. These chemicals are selected for their compatibility with tank and pipeline systems, as well as their absence in the environment around the tank. The tracer has no impact on the tanks and piping or on the properties of the product.



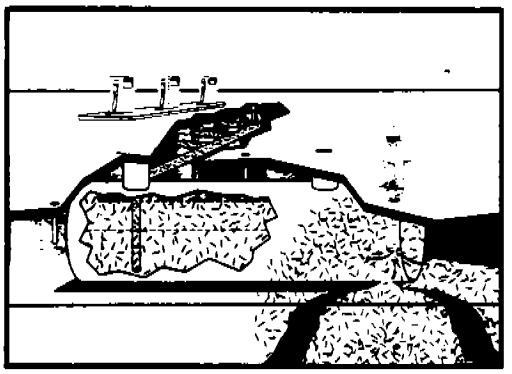


Step 2

If a tank or pipeline leaks, the tracer vapors escape into the surrounding soil.

Step 3

Detection of the tracer in the soil surrounding the tank or pipeline indicates a leak and reveals its location. Clients can also be provided with a hydrocarbon site survey. Hydrocarbon vapors help to reveal the extent of contamination.



THE *TRACER TIGHT* NO DOWNTIME TEST IS THE MOST COST EFFECTIVE TEST YOU CAN BUY

TRACER TIGHT ADVANTAGES OVER VOLUMETRIC TANK TESTING

- No service interruption during testing.
- Tests full, empty or partially full tanks.
- Test results are unaffected by temperature, density and vapor pressure of tank contents.
- Reliably tests tanks of all sizes.

TRACER TIGHT ADVANTAGES OVER VACUUM TESTING

- Tracer Tight works under real field conditions. Third party evaluations of Tracer Tight were conducted using a variety of real world situations rather than carefully controlled laboratory conditions.
- Tracer Tight will not be foiled by the ingress of previously leaked fuel. Fuel ingress does not produce a detectable signal.

TRACER TIGHT ADVANTAGES OVER OTHER VAPOR MONITORING TESTS

- No background problems. Results are unaffected by the presence of chemicals or hydrocarbons from old leaks or spills.
- Problems from false alarms are virtually eliminated.

MONTHLY MONITORING OR RETESTING

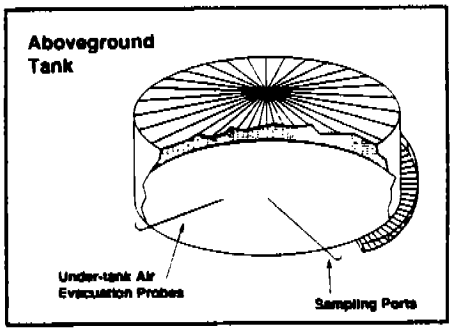
Once sampling probes are installed and an initial test is performed, Tracer Research can provide leak monitoring or retesting on a monthly basis or whenever leaks must be verified.

Costs for Tracer Tight monitoring and retesting are extremely competitive with other systems.

ABOVEGROUND STORAGE TANKS

Aboveground tank testing is performed by inserting vapor sampling probes under the tank bottom. Tracer is then added to the product. In the event of leakage, tracer is carried into the soil where it evaporates and spreads into the soil porosity. Samples are collected from under the tank and are analyzed for the presence of tracer.

A patented "Tracer Check Test" is performed to prove test accuracy and validity. The test is used to simulate leakage and determines the ease with which a leak can be detected.



A monitoring probe system is installed under the bottom of any existing aboveground tank to provide extremely sensitive, low cost, leak monitoring capability.

TESTING AND LEAK LOCATION IN PIPELINES AND LONG TRANSFER LINES

Tracer Tight pipeline leak testing is effective for locating leaks in all types of installations, including pipes buried under pavement, airline runways, buildings, or underwater.

Where leaks are known to exist, the Tracer Tight test determines leak location without expensive excavation.

This is the only practical external pipeline monitoring system that can be retrofitted to existing underground piping.

TANK FARMS

Tracer Tight leak tests are the most economical means for testing aboveground and underground tanks and pipelines at large tank installations, such as jet fuel systems at military bases, large airport hydrant fuel systems, pipeline terminals and refineries. Important benefits result from the fact that the Tracer Tight method tests very large tanks with the same sensitivity as small tanks and is performed without taking the system out of service. The method is extremely effective in testing complex systems.

TRACER TIGHT AFFILIATE NETWORK

Tracer Tight tests are conducted by a nationwide network of trained and licensed affiliates. Many of them are tank management firms offering a full spectrum of services for tank owners and operators. In addition to a variety of tanks tests, they offer site assessments, tank and pipeline upgrades, monitoring, tank removal and site cleanup.

Tracer Research Corporation

3755 5705

Annapolis Office:
(410) 263-5605

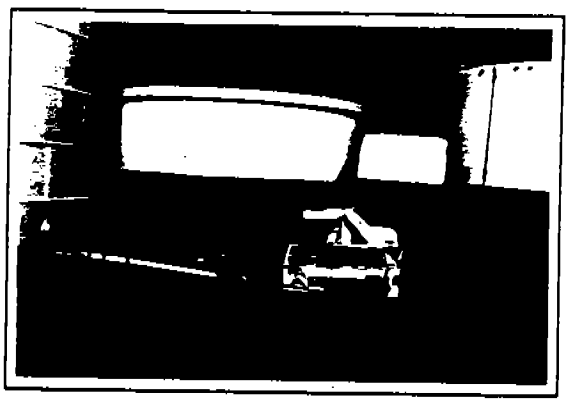
Tracer Research Corporation

ABOVEGROUND STORAGE TANK TESTING

*The **Tracer Tight®** AST test surpasses all other test methods by virtue of its great leak detection sensitivity and its compatibility with site operations. It possesses the following unique features:*

- ***Most Sensitive Leak Detection Method Available***
- ***No Down Time. Tanks Remain In Service During Testing***
- ***Use With Any Size Tank Without Loss of Sensitivity***
- ***Use With Any Product. No Fill Required***
- ***Test Results Provide Leak Location***
- ***Cost Effective Subsequent Testing And Monitoring***
- ***Not Affected By Hydrocarbon Background From Previous Spills Or Leaks***

TRACER RESEARCH CORPORATION's **Tracer Tight®** methodology is the most accurate and sensitive method available for detecting, locating, and quantifying leaks in aboveground storage tanks, fuel distribution systems and pipelines. The test detects leakage of less than one gallon per day under tank floors.



Tracer Tight® Leak Detection is based upon the presence of the tracer chemical, and the test is not affected by hydrocarbon background from previous spills or leaks. The test is not affected by outside variables that interfere with other test methods such as weather, temperature, facility use, and noise.

Tracer Tight® AST test is performed by installing an array of vapor collection probes under the tank floor and adding a trace amount of a volatile chemical to the contents of the tank. If the volatile chemical (tracer) can be detected under the tank in the vapor collection system, a leak is indicated. The probes are permanently installed for use in monitoring and further precision testing.

Tracer Tight® method uses Q/A checks during the course of the installation and testing process to ensure that probes are installed and spaced properly, that the tracer is properly mixed in the product, and that the soil conditions are adequate to allow vapor movement under the tank. Proof of test sensitivity and validity is demonstrated with each tank test by means of a patented "Tracer Check Test". This test is performed by releasing a second tracer under the tank which is different from that mixed with the product inside the tank. This "Check Tracer" is used to simulate leakage. The ease with which it can be detected indicates the ease with which an actual leak in the tank bottom could be detected.

Use **Tracer Tight®** AST methodology to protect your company from financial losses caused by tank leakage and subsequent environmental damage. The test costs far less than internal tank inspection and is more effective at detecting leakage than any other inspection technique. It is the most cost effective means of prioritizing tanks for inspection if a large number of tanks must be maintained. After probe installation and initial test, all subsequent testing and monitoring can be performed at a greatly reduced cost.

State and Federal Agencies are developing laws that require AST owners to inspect and monitor their tanks for possible leakage. The tank owners' best defense against over-regulation is to take the initiative and develop their-own environmental monitoring program to show proactive concern for environmental issues.

Tracer Tight® Aboveground Storage Tank Testing

Tracer Research Corporatior

Annapolis Office:
(410) 263-5605

ALD 2000

Tracer Research Corporation

Tracer Research Corporation

Automatic Leak Detection

- *Real-Time Leak Detection from Simple or Large, Complex Systems*
- *Automatic Leak Detector Continuously Collects and Analyzes Samples*
- *Configures To Meet Client Needs*
- *Internal Diagnostics Ensures Sample Integrity*
- *Capable of Detecting Tracers and Hydrocarbons*
- *Audible or Visual Alarm Automatically Warns of Leaks*
- *Leaks Located to Within 10 Feet*

Tracer Research Corporation has developed an Automatic Leak Detector (ALD). The ALD is designed to service your underground and aboveground storage tank facilities and pipeline systems as an extension of the Tracer Tight® concept of leak detection. An inert volatile chemical, compatible with all common types of tanks and piping, is introduced into the product. If the tracer chemical is detected outside of the system, it is leaking. The sample showing the highest concentration of tracer indicates leak location.

The ALD is a modular microprocessor controlled device that continuously collects and analyzes vadose zone samples for both the presence of tracers and hydrocarbons. Depending upon the application, the ALD is made up of three modules. The modules consist of a multiplexing valve box, an analytical module and an industry standard personal computer.

The valve box can be configured with up to 96 discreet sampling ports. Internal diagnostics are run during the collection of each sample to ensure sample integrity. The valve box is designed to be intrinsically safe and explosion proof for applications that require the installation of the box in areas with potentially explosive environments. Furthermore the enclosure is designed to withstand temperatures ranging from -40C to 60C and will withstand salty coastal environments.

The analytical module has detectors capable of detecting both tracers and hydrocarbons. Self diagnostics are run to validate the connection to each valve box during the collection of each sample, as well as the proper operation of the detectors. The detectors are automatically recalibrated during each analytical cycle, or as frequently as needed.

The interface to the valve box and analytical modules is an industry standard personal computer (PC). The PC stores information from each analysis and provides graphical output. Information regarding the date, time, location, operating parameters and detection of tracer and hydrocarbons is stored. Historical data is plotted on screen allowing for easy trend analysis. If tracer is detected or hydrocarbon data indicates leakage, an alarm is prompted. The alarm can be configured to meet a customers individual needs and can range from a light or audible alarm to voice communication via a modem to a remote operator.

The Tracer Research Corporation ALD offers continuous real-time leak detection of everything from very simple to very large and complex systems. The modular design allows the device to be configured to exactly meet particular client requirements. Leak detection occurs from the detection of tracer from either individual probes driven into the ground or from long lengths of semi-permeable hose buried adjacent to pipelines. Leaks can be located to within 10 feet.

Automatic Leak Detection Designed to Meet Your Needs

Tracer Research Corporation

3755

Annapolis Office:
(410) 263-5605

Tracer Research Corporation
3855 North Business Center Drive
Tucson, Arizona 85705
(602) 888-9400

MATERIAL SAFETY DATA SHEET

Product: TRACER A

Section I

Supplier:	Tracer Research Corporation	Telephone number for information:	(800) 843-9929
Address:	3855 North Business Center Drive Tucson, Arizona 85705 USA	Date prepared:	November 1991
		Signature of preparer:	

Section II - Hazardous Information

Hazardous Classification:	Non-hazardous	Hazard:	Non-hazardous

Section III - Physical/Chemical Characteristics

Boiling Point (°C):	Sublimes -63.9, 1 atmos.	Specific Gravity (water = 1):	Not applicable
Vapor Pressure (mm Hg):	Not applicable	Vapor Density (air = 1):	5.1 @ 1 atm., 21.1°C
% Volatiles by Volume (at 20°C)	Not applicable	Evaporation Rate (Butyl Acetate = 1):	Not applicable
Solubility in Water:	slight	Appearance and odour:	Colourless, odourless gas.

Section IV - Precautions/Procedures

Flash point: Flammable limits	Not applicable Not applicable
Extinguishing Media: Fire extinguishing agents to avoid:	Not applicable None
Special Fire Fighting Procedures:	Wear self-contained breathing apparatus approved by NIOSH. Use water spray to keep cylinders cool.

Section V - Hazards (Health)

Inhalation:	Pure Tracer A is of a low order of toxicity, but may act as an asphyxiant if oxygen is reduced to below 16%, as indicated by paleness, [illegible] cyanosis (blue skin)
Ingestion:	Not applicable
Skin:	No effects reported. May be irritant.
Eyes:	No effects reported. May be irritant.
Permissible concentration: air	1000 ppm or 6000 mg/m^3 (OSHA). TLV (ACGIH): same.

Section V I - Reactivity Data

Stability	Stable Conditions to Avoid: None
Incompatibility (Materials to Avoid):	Active metals, fires of metal hydrides, material containing own oxygen.
Hazardous Decomposition or Byproducts:	Hydrogen halides at flame temperature in trace amounts.
Hazardous Polymerization:	Will not occur Conditions to Avoid: None

Section VII - Personal Protective Equipment

Respiratory Protection:	Use self contained breathing apparatus or air supplied respirator.
Eyes and Face:	Safety glasses.
Hands, Arms, and Body:	Not generally required.
Other Clothing and Equipment:	Not generally required.

Section VIII - Emergency and First Aid Procedures

Inhalation:	Immediately remove to fresh air. If breathing has stopped, give artificial respiration, preferably mouth to mouth. If breathing is difficult, give oxygen provided a qualified operator is available. Call a physician.

Section IX - Precautions for Safe Handling and Use

Degradability/Aquatic toxicity:	Not estimated to be biodegradable.

Waste Disposal Method:

Disperse in atmosphere. Discard disposable containers as non hazardous waste. Return empty or partially filled cylinders to Tracer Research Corporation, 3855 North Business Center Drive, Tucson, Arizona.

RCRA status of unused material:	Not a "hazardous waste".

Normal Handling:	Protect containers from physical damage.
Storage:	Protect containers from physical damage, heat, and sunlight. Store in area of low fire risk.
Spill/Leak:	Evacuate unprotected personnel. Protected personnel may shut off leak. Product will disperse itself.
Special:	NOTE: The product hve no warning properties. The gas is odorless. Tracer A exposed to electric arcs may break down into toxic byproducts Avoid breathing Tracer A which has been thus exposed. Comply with OSHA Regulation for Compressed Gas and Contaminants.

Section X - Control Measures

Respiratory protection:	Use self contained breathing apparatus or air-supplied respirator.	
Ventilation:	Local Exhaust:	See mechanical.
	Mechanical:	All indoor areas should be well ventilated
	Special:	None
	Other:	None

Gloves:	None.
Eye Protection:	Safety glases
Hands, Arms, and Body:	Not generally required.
Other Protective Equipment:	Not generally required.

Section XI - Other Information

Information on this form is furnished solely for the purpose of compliance with OSHA's Hazard Communication Standard, 29 CFR 1910.1200 and shall not be used for any other purpose.

Tracer Research Corporation
3855 North business Center Drive
Tucson, Arizona 85705
(602) 888-9400

MATERIAL SAFETY DATA SHEET

Identity:	TRACER D

Section I

Supplier:	Tracer Research Corporation	Telephone number for information:	(800) 843-9929
Address:	3855 North Business Center Drive Tucson, Arizona 85705 USA	Date prepared:	November 1991
		Signature of preparer:	

Section II - Hazardous Ingredients/Identity Information

Hazardous Classification:	Non-hazardous	Hazard:	Non-hazardous

Section III - Physical/Chemical Characteristics

Boiling Point (°F):	75	Melting Point (°C):	not available
Vapor Density (air = 1):	7.2	Specific Gravity (H_2O = 1):	2.29
Solubility in Water (at °C; g/l):	negible	Vapor Pressure (mm Hg.):	652 at 70°F
Appearance and odour:	Clear, sweet-smelling odour, colourless liquid.		

Section IV - Fire and Explosion Hazard Data

Flash point:	none	Flammable Limits:	none
LEL: UEL:	None None	Extinguishing Media:	Tracer D is a fire extinguishing media.
Special Fire Fighting Procedures:	Exposure to personnel is to be avoided from a spill.		
Unusual Fire and Explosion Hazards:	Tracer D is relatively toxic to humans at levels below fire extinguishing concentrations.		

Section V - Reactivity Data

Stability:	Stable	Hazardous Decomposition or Byproducts:	On contact with flames or hot surfaces, hydrogen bromide, hydrogen fluoride, free bromine and small amounts of carbonyl halides may be emitted.
Hazardous Polymerization:	Will not occur	Conditions to Avoid:	None

Section VI - Health Hazard Data

Routes of Entry:		
	Ingestion:	No
	Inhalation:	Yes
	Skin:	No

Health Hazards (Acute and Chronic):

Contact with liquid can cause frostbite. The approximate lethal concentration (ALC) to rats for 15 minutes is 54,000 ppm. Exposure to greater than 1000 ppm may lead to dizziness and lack of coordination. A level of 2500 ppm is immediately dangerous to life and health (IDLH level). Chronic over-exposure may cause liver damage.

Carcinogenicity:	
NTP:	no
IARC Monographs:	no
OSHA Regulated:	no

Signs and Symptoms of Exposure:

Tracer D is irritating to the nose and throat. Inhalation can cause drowsiness and unconsciousness. Liquid contact with skin can cause frostbite. Anaesthetic effects will increase as exposure levels rise and at high exposure levels cardiac arrythmias may be noted.

Medical Conditions Generally Aggravated by Exposure:

Heart conditions may be aggravated by exposure.

Emergency and First Aid Procedures:

Remove person to fresh air, administer oxygen, get medical attention. Note to Physician: Do not use epinephrine as a cardiac arrythmia could result.

Section VII - Precautions for Safe Handling

Steps to be taken in Case Material is Released and Spilled: Evacuate and completely ventilate the area. Material will evaporate without a residue.

Waste Disposal Method:

Return empty or partially filled cylinders to Tracer Research Corporation, 3855 North Business Center Drive, Tucson, Arizona. Discard disposable container as non hazardous waste. Discharge to atmosphere. Avoid breathing fumes.

Other Precautions:

Storage area should be well ventilated.

Precautions to be Taken in Handling and Storing: Transfer from one vessel to another must be done in a manner to prevent exposure to concentrations in excess of 100 ppm.

Section VIII - Control Measures

Respiratory Protection:	Wear NIOSH approved self-contained breathing apparatus if concentrations above 1000 ppm are expected.
Ventilation:	Local Exhaust - Use to keep levels below the TLV. Mechanical - use for general area control.
Protective Gloves:	None
Eye Protection:	None
Other Protective Equipment:	None
Work/Hygienic Practices:	Ensure that piping is empty before doing maintenance work.

Section IX - Hazardous Components

Component:	Tracer D
OSHA PEL:	100 ppm
ACGIH TLV:	100 ppm
Other Limits Recommended:	Not established
% (Optional):	99

Section XI - Other Information

Information on this form is furnished solely for the purpose of compliance with OSHA's Hazard Communication Standard, 29CFR 1910.1200 and shall not be used for any other purpose.

Tracer Research Corporation
3855 North Business Center Drive
Tucson, Arizona 85705
(602) 888-9400

MATERIAL SAFETY DATA SHEET

Identity: TRACER F

Section 1

Supplier:	Tracer Research Corporation	Telephone number for Information:	(800) 843-9929
Address:	3855 North Business Center Drive Tucson, Arizona 85705 USA	Date prepared:	November 1991
		Signature of preparer:	

Section II - Hazardous Ingredients/Identity Information

Hazardous Classification:	Non-hazardous	Hazard:	Non-hazardous

Section III - Physical/Chemical Characteristics

Boiling Point (°F):	117 (47.3°C)	Specific Gravity (water = 1):	2.18 at 70°F
Vapor Pressure (mm Hg.):	352 at 70°F	Vapor Density (air = 1):	8.97
Freezing Point:	-167°F	Evaporation Rate (Butyl Acetate = 1):	Not available
Solubility in Water:	negible	Appearance and colour:	Clear, colorless, high density liquid.

Section IV - Fire and Explosion Hazard Data

Flash point: non-flammable
Flammable limits: Not applicable
LEL: Not applicable
UEL: Not applicable

Extinguishing Media: Tracer F is a fire extinguishing agent.

Special Fire Fighting Procedures: None

Unusual Fire and Explosion Hazards:

Above 750°F Tracer F decomposes to form hydrogen bromide, hydrogen fluoride and free bromine and possibly small amounts of carbonyl halides which are irritating and potentially toxic if fire extinguishment is prolonged.

Section V - Reactivity Data

Stability: Extremely stable
Conditions to Avoid: None

Incompatibility (Materials to Avoid): None known.

Hazardous Decomposition or Byproducts: On contact with flames or hot surfaces, hydrogen bromide, hydrogen fluoride, free bromine and small amounts of carbonyl halides may be emitted.

Hazardous Polymerization: Will not occur
Conditions to Avoid: None

Section VI - Health Hazard Data

Routes of Entry:	Ingestion:	Acute animal studies indicate no adverse effect
	Inhalation:	Yes
	Skin:	Unknown

Health Hazards (Acute and Chronic): The inhalation LC_{10} for rats is 15 minutes. The 4 hour inhalation LC_{50} for rats is 50,000 ppm or 5%. The lethal exposures involved the central nervous system and death by anesthesia. At 2500 ppm dogs exposed to Tracer F developed cardiac arrythmias and some deaths from ventricular fibrillation. Concentrations of 1000 ppm and above are considered to be unsafe for human exposure. The acute health hazards are the potential for cardiac arrythmias and anesthic effects on the central nervous system. Chronic health hazards are not known.

Carcinogenicity:	NTP?	no	Medical Conditions Generally Aggravated by Exposure:
	IARC Monographs?	no	
	OSHA Regulated:	no	Heart conditions may be aggravated by high concentrations.

Signs and symptoms of exposure:

Concentrations in excess of 2000 ppm cause central nervous system effects such as dizziness and impaired coordination and possibly cardiac arrythmias. prolonged exposure may lead to unconsciousness and possibly death.

Section VII - Emergency and First Aid Procedures

Inhalation:	Remove victim to fresh air. Give symptomatic and supportive care. Get medical attention. NOTE: Adrenalin is contraindicated in the treatment of overexposure to Tracer F.
Skin contact:	Flush with water. If irritation occurs get medical attention.
Eye contact:	Flush with water for 15 minutes. Get medical attention.
Ingestion:	Get medical attention.

Section VIII - Precautions for Safe Handling and Use

Steps to be taken in case material is released or spilled:

Evacuate and completely ventilate area. Wear self-contained breathing apparatus for rescue operations. Material will evaporate without a residue.

Waste Disposal Method:

Discharge contents to atmosphere. Avoid breathing fumes. Discard disposible containers as non-hazardous waste. Return empty or partially filled cylinders to Tracer Research Corporation, 3855 North Business Center Drive, Tucson, Arizona.

Precautions to be taken in handling and storage:

Avoid container damage. Keep containers tightly closed.

Section IX - Control Measures

Respiratory protection:	Use NIOSH approved self-contained breathing apparatus if exposed to concentrations of 1000 ppm or greater.	
Ventilation:	Local Exhaust:	See mechanical.
	Mechanical:	All indoor areas should be well ventilated
	Special:	None
	Other:	None

Gloves:	None.
Eye Protection:	Chemical safety goggles.
Other Protective Equipment:	None
Work/Hygienic Practices:	Determine that piping is empty before doing maintenance work.

Section X - Hazardous Components

Component:	Tracer F
OSHA PEL:	Not established
ACGIH TLV:	Not established
Other Limits Recommended:	Not established
% (Optional):	99.9

Section XI - Other Information

Information on this form is furnished solely for the purpose of compliance with OSHA's Hazard Communication Standard, 29 CFR 1910.1200 and shall not be used for any other purpose.

Tracer Research Corporation
3855 North Business Center Drive
Tucson, Arizona 85705
(602) 888-9400

MATERIAL SAFETY DATA SHEET

Identity: TRACER C

Section I

Supplier:	Tracer Research Corporation	Telephone number for information:	(800) 843-9929
Address:	3855 North Business Center Drive Tucson, Arizona 85705 USA	Date prepared:	November 1991
		Signature of preparer:	

Section II - Hazardous Ingredients/Identity Information

Hazardous Classification:	Non-hazardous	Hazard:	Non-hazardous

Section III - Physical/Chemical Characteristics

Boiling Point (°C):	-4	Specific Gravity (water = 1):	1.83
Vapor Pressure (mm Hg.):	1770 at 68°F	Vapor Density (air = 1):	5.8 at 68°F
Melting Point:	Not available	Evaporation Rate (Butyl Acetate = 1):	Not available
Solubility in Water:	Insoluble	Appearance and odour:	Clear, colourless, sweet odour gas and liquid.

Section IV - Fire and Explosion Hazard Data

Flash point:	non-flammable
Flammable limits:	Not applicable
LEL:	Not applicable
UEL:	Not applicable
Extinguishing Media:	Tracer C is a fire extinguishing agent.
Special Fire Fighting Procedures:	At flame temperature, Tracer C may release hydrogen halides and halogens in trace amounts.
Unusual Fire and Explosion Hazards:	Predominant decomposition products are hydrogen chloride and hydrogen bromide. The products are irritating and potentially toxic if fire extinguishment is delayed.

Section V - Reactivity Data

Stability:	Stable Conditions to Avoid: None
Incompatibility (Materials to Avoid):	Active metals, fires of metal hydrides, material containing own oxygen.
Hazardous Decomposition or Byproducts:	Hydrogen halides at flame temperature in trace amounts.
Hazardous Polymerization:	Will not occur Conditions to Avoid: None

Section VI - Health Hazard Data

Routes of Entry: Ingestion: No.
Inhalation: Yes
Skin: No

Health Hazards (Acute and Chronic): The acute inhalation LC_{50} for rats with 4 hours is 211.2 mg./l. The Underwriters Laboratories classification of comparative life hazard of Tracer C is group 5. At concentrations above 4%, Tracer C can produce dizziness, impaired coordination, and cardiac effects.

Carcinogenicity: NTP? no
IARC Monographs? no
OSHA Regulated: no

Medical Conditions Generally Aggravated by Exposure:

Cardiac conditions may be aggravated by overexposure.

Signs and symptoms of exposure:

Exposure for more than a few minutes, above 4% (17 lb./1000 cu. ft. air) can produce dizziness, impaired coordination and cardiac effects.

Section VII - Emergency and First Aid Procedures

Inhalation:
Remove victim to fresh air. Give symptomatic and supportive care. Get medical attention. NOTE: Adrenalin is contraindicated in the treatment of overexposure to Tracer C.

Section VIII - Precautions for Safe Handling and Use

Steps to be taken in case material is released or spilled:

Ventilate enclosed areas in case of inadvertent or deliverate discharge of Tracer C.

Waste Disposal Method:

Disperse in atmosphere. Avoid breathing fumes. Return empty or partially filled cylinders to Tracer Research Corporation, 3855 North Business Center Drive, Tucson, Arizona. Discard disposable containers as non-hazardous waste.

Precautions to be taken in handling and storage:

Avoid container damage.

Other Precautions:

None.

Section IX - Control Measures

Respiratory protection: Use self-contained breathing apparatus to exposed to concentrations greater than 4%.
Ventilation: Local Exhaust: See mechanical.
Mechanical: All indoor areas should be well ventilated
Special: None
Other: None

Gloves: None.
Eye Protection: None.
Other Protective Equipment: None
Work/Hygienic Practices: Determine that piping is empty before doing maintenance work.

Section X - Hazardous Components

Component: Tracer C
OSHA PEL: Not established
ACGIH TLV: Not established
Other Limits Recommended: Not established
% (optional): > 99.

Section XI - Other Information

Information on this form is furnished solely for the purpose of compliance with OSHA's Hazard Communication Standard, 29 CFR 1910.1200 and shall not be used for any other purpose.

APPENDIX D

TECHNICAL MEMORANDA

TerraProbe℠ Subsurface Soil Sampling
Sediment and Surface Water Sampling
Surface Soil Samples
Decontamination Procedures
Low Flow Groundwater Sampling

TECHNICAL MEMORANDUM

PREPARED BY: Gregory M. Brown

DATE: September 23, 1991

TITLE: SEDIMENT AND SURFACE WATER SAMPLING

PURPOSE: The purpose of this technical memorandum (TM) is to provide technical guidance and standard operating procedures for sediment and surface water sampling at Naval Station Mayport, Florida. This TM presents the sediment and surface water sampling methods specific for conditions expected to be encountered at Naval Station Mayport during RCRA Facility Investigations (RFI).

SCOPE: The scope of this TM covers sediment and surface water sampling methods for the RFI at Naval Station Mayport. Standard operating procedures for related activities are presented in other applicable Technical Memoranda.

Surface water and sediment samples will be taken from the drainage conveyance system at the site to assess its potential to accumulate and/or transport contamination from potential source locations. The data will also be used to assess potential risks to the environment.

Sediment Samples. Sediment samples should be collected under dry conditions, if possible, when standing water is absent. When conditions are dry, sediment sampling should follow the protocols described in the Technical Memorandum, Surface Soil Sampling, Appendix B, Volume II, Sampling and Analysis Plan, for collecting surface soil samples. If standing water is present at the sediment sampling location, surface water samples should be obtained prior to sediment sampling. Applicable health and safety procedures should be followed for work near open water. A "buddy" system shall be used. Sediment samples will be collected under wet conditions by the following procedures.

1. Sampling locations will be approached from downstream. Locations will be marked with survey stakes and tape. Sample location will be documented with a photograph.

2. Sampling equipment will be decontaminated prior to each sampling event using the procedures described in the Technical Memorandum, Decontamination Procedures, Appendix B, Volume II, Sampling and Analysis Plan.

3. Samples will be numbered and containers will be labeled as directed in Section 3.1, Volume II, Sampling and Analysis Plan.

4. The sediment sample will be collected with a decontaminated stainless-steel push tube (e.g., a Shelby tube). The sample will be collected by pushing the tube into the sediment to the desired depth. The tube will be worked to loosen the sample and the tube will be carefully removed without losing the sample. The sample will be extruded from the tube with a new wooden dowel and placed into a clean glass jar with a Teflon™-lined lid.

5. If retrieval with a Shelby tube is unfeasible, the sample will be obtained using a Ponar Dredge. The dredge will be lowered slowly through the water

column. Upon contact with the bottom sediments, a locking mechanism releases, which allows the dredge to close. The dredge will be returned to the surface, opened, and water captured in the top, slowly drained to minimize loss of fine particles that may be present. The dredge will be opened and the contents placed into clear sample jars with Teflon™-lined lids. The method of sampling will be documented.

6. The sampling activities performed at each location will be documented, including chain-of-custody forms, according to Section 3.1, Volume II, Sampling and Analysis Plan.

7. The outside of the sample containers will be decontaminated using the procedures in the Technical Memorandum, Decontamination Procedures, Appendix B, Volume II, Sampling and Analysis Plan.

8. The samples will be preserved according to Section 3.1, Volume II, Sampling and Analysis Plan.

9. Personnel will proceed to the next sampling location.

10. When all sediment samples are collected, containers will be packaged following the procedures in Section 3.1, Volume II, Sampling and Analysis Plan.

Surface Water Samples. Surface water samples should be collected before sediment samples if wet conditions exist. Applicable health and safety procedures should be followed for work near open water. Surface water samples will be collected using the procedures below.

1. The sampling locations will be approached from downstream. The locations will be marked with survey stakes and tape. The sample locations will be documented with a photograph.

2. Sampling equipment will be decontaminated prior to each sampling episode using the procedures described in the Technical Memorandum, Decontamination Procedures, Appendix B, Volume II, Sampling and Analysis Plan.

3. Samples will be numbered and containers will be labeled as directed in Section 3.1, Volume II, Sampling and Analysis Plan.

4. Surface water will be collected with a decontaminated wide-mouth glass jar, glass or stainless-steel beaker, or Kemmer™ sampler. The sample will be collected by inverting the container while entrapping air. The sample collection container will be submerge to a depth of approximately 1 foot. The sample collection container will be rotated quickly to expel the air and the water sample will be collected. The sample collection container will be removed quickly while avoiding collection of sediment. Then the sample collection container will be closed until the analytical sample bottles are filled.

5. A second sample will be obtained in a clean container and the pH, temperature, and specific conductance will be measured in the field. The container will be thoroughly rinsed with deionized water between sampling locations.

6. The water sample will be poured from the sample collection container into clear analytical sample bottles. The samples will be preserved according to Section 3.1, Volume II, Sampling and Analysis Plan.

7. The sampling activities performed at each location will be documented including chain-of-custody forms, according to Section 3.1, Volume II, Sampling and Analysis Plan.

8. The outside of the sample containers will be decontaminated using the procedures in the Technical Memorandum, Decontamination Procedures, Appendix B, Volume II, Sampling and Analysis Plan.

9. Personnel will then proceed to the next sampling location.

10. When all surface water samples are collected, containers will be packaged following the procedures in Section 3.1, Volume II, Sampling and Analysis Plan.

TECHNICAL MEMORANDUM

PREPARED BY: Gregory M. Brown

DATE: September 23, 1991

TITLE: SURFACE SOIL SAMPLES

PURPOSE: The purpose of this Technical Memorandum (TM) is to provide technical guidance and standard operating procedures for surface soil sampling at Naval Station Mayport, Florida. This TM presents the surface soil sampling methods specific for conditions expected to be encountered at Naval Station Mayport during RCRA Facility Investigation (RFI).

SCOPE: The scope of this TM covers soil sampling methods for the RFI at Naval Station Mayport. Standard operating procedures for related activities are presented in other applicable Technical Memoranda.

The procedures described below described below shall be followed when collecting surface and shallow soil samples:

1. Sampling equipment coming into contact with soil samples will be decontaminated prior to sampling, between sampling locations, and at the completion of work using the procedures outlined in the Technical Memorandum, Decontamination Procedures, Appendix B, Volume II, Sampling and Analysis Plan.

2. Decontaminated equipment will be stored on clean polyethylene sheeting or wrapped in aluminum foil or plastic bags between uses. Following decontamination, the sampling equipment will not be allowed to touch the ground prior to use.

3. The samples will be numbered and containers will labelled as directed in Section 3.1, Volume II, Sampling and Analysis Plan.

4. The sample location will be located and marked with a surveyor's flag or equivalent.

5. Background HNU, OVA, or TIP readings will be obtained. Readings at soil surface and in breathing zone will be obtained while collecting samples. Organic vapor readings will be recorded in the field logbook.

6. Sticks, leaves, and other surface debris in vicinity of sampling location will be removed.

7. Surface and shallow soil samples will be collected using a soil hand auger.

8. Surface samples will be collected no deeper than 0 to 1 foot. Shallow surface samples will be collected by auguring through clean backfill, if present, to the interface with native soil. The sample will be collected at this interval. After retrieval, depth of hole will be measured with a clean, metal ruler or mark on the auger. The sample will be placed in a

clean glass jar and labeled. The sample will be preserve in accordance with Section 3.1, Volume II, Sampling and Analysis Plan.

9. The sampling locations will be photographed. The sample location will be measured relative to local reference landmarks and an entry into logbook.

10. Personnel will proceed to the next sample point and will repeat steps 4 through 9, using decontaminated sampling equipment.

11. Field documentation and chain-of-custody records for each sample will be completed according to Section 3.1, Volume II, Sampling and Analysis Plan.

12. The outside of the sample containers will decontaminated using the procedures in the Technical Memorandum, Decontamination Procedures, Appendix B, Volume II, Sampling and Analysis Plan.

13. The samples will be preserved according to Section 3.1, Volume II, Sampling and Analysis Plan.

14. The packaging and shipping protocol will be followed as described in Section 3.1, Volume II, Sampling and Analysis Plan.

TECHNICAL MEMORANDUM

PREPARED BY: Gregory M. Brown

DATE: September 23, 1991

TITLE: DECONTAMINATION PROCEDURES

PURPOSE: The purpose of this Technical Memorandum (TM) to provide technical guidance and standard operating procedures for decontamination procedures during field activities at Naval Station Mayport, Florida. This TM presents the decontamination procedures required for specific conditions expected to be encountered at Naval Station Mayport during RCRA Facility Investigation (RFI).

SCOPE: The scope of this TM covers decontamination procedures for the RFI at Naval Station Mayport. Standard operating procedures for related activities are presented in other applicable Technical Memoranda.

Decontamination of personnel and equipment will be performed to minimize the possibility of transport of contaminants off-site and between work areas, and to assure sample integrity. Sampling equipment coming in contact with soil, sediment, and water will be decontaminated prior to sampling, between sampling locations, between boring intervals, and at completion of the work. This will minimize the potential for cross contamination.

Decontamination of equipment will occur at the exclusion zone of the intrusive activities and at a main decontamination station. Small sampling and field equipment (e.g., trowels, bowls, sample containers, etc.) will be cleaned at the exclusion zone. A central decontamination station will be established for cleaning of augers, drilling bits, large tools, drill rigs, monitoring well supplies, and other large items.

Teflon™ and/or glass sampling equipment used for trace organics and/or metal sample collection will be decontaminated in accordance with U.S. Environmental Protection Agency (USEPA) Region IV ECB SOPQAM requirements using the following procedures:

1. Equipment will be washed thoroughly with laboratory detergent and water using a brush to remove any particulate matter or surface film.

2. The equipment will be rinsed thoroughly with tap water.

3. The equipment will be rinsed with at least a 10 percent nitric acid solution.

4. Equipment will be rinsed thoroughly with tap water.

5. Equipment will be rinsed thoroughly with deionized water.

6. Equipment will be rinsed twice with pesticide-grade isopropanol.

7. Equipment will be rinsed thoroughly with deionized water and allowed to air dry.

8. Equipment will be wrapped in one layer of aluminum foil. The edges of foil will be rolled into a "tab" to allow for easy removal. The foil wrapped equipment will be sealed in plastic and dated.

9. The Teflon® or glass sampling equipment will be rinsed thoroughly with tap water in the field as soon as possible after use.

When this sampling equipment is used to collect samples that contain oil, grease, or other hard to remove materials, it may be necessary to rinse the equipment several times with pesticide-grade acetone or hexane to remove the materials before proceeding with Step 1. In extreme cases, it may be necessary to steam clean the field equipment before proceeding with Step 1. If the field equipment cannot be cleaned using these procedures, it should not be used.

Small and awkward equipment such as vacuum bottle inserts and well bailers may be soaked in the nitric acid solution instead of being rinsed with it. Fresh nitric acid solution should be prepared for each cleaning session.

Stainless-steel or metal sampling equipment used for trace organics and/or metal sample collection will be decontaminated in accordance with USEPA Region IV ECB SOPQAM requirements using the following procedures:

1. Equipment will be washed thoroughly with laboratory detergent and water using a brush to remove any particulate matter or surface film.

2. Equipment will be rinsed thoroughly with tap water.

3. Equipment will be rinsed thoroughly with deionized water.

4. Equipment will be rinsed twice with pesticide-grade isopropanol.

5. Equipment will be rinsed thoroughly with deionized water and allowed to air dry.

6. Equipment will be wrapped in one layer of aluminum foil. The edges of foil will be rolled into a "tab" to allow for easy removal. The foil wrapped equipment will be sealed in plastic and date.

7. The stainless-steel or metal sampling equipment will be rinsed thoroughly with tap water in the field as soon as possible after use.

Well sounders and tapes used to measure groundwater levels will be decontaminated in accordance with the following procedures. They will be:

1. washed with laboratory detergent and tap water,

2. rinsed with tap water,

3. rinsed with deionized water,

4. wrapped in polyethylene bags or sheeting to prevent contamination during storage or transit.

5. allowed to air dry, and

The following procedures will be used to decontaminate the Goulds Pump used for well purging. Always disconnect the pump control box from the generator before cleaning.

1. Using a brush, the exterior of the contaminated hose and pump will be scrubbed with soapy water (e.g., using Alconox™).

2. The soap will be rinsed from the outside of pump and hosed with tap water.

3. The tap water residue will be rinsed from the outside of the pump and hosed with deionized water.

4. Equipment will be placed in a polyethylene bag or wrapped with polyethylene film to prevent contamination during storage or transit.

Large equipment (e.g., drill rig, augers) will be decontaminated using the procedures outlined below.

1. The equipment will be moved to the decontamination station after sampling and field activities are complete.

2. The equipment will be decontaminated using a high pressure steam cleaner with a soap cycle and water cycle. Scraping and scrubbing may be necessary to remove encrusted material. Items will be placed on sawhorses, pallets, or the equivalent to prevent contact with the ground.

3. The equipment will be rinsed with potable water.

4. The equipment will be placed on polyethylene sheeting, sawhorses, or clean pallets and allowed to dry.

Sampling and field equipment should not contact the ground surface prior to the next sampling location. Wrap appropriate equipment (i.e., monitoring well installation supplies) in polyethylene (plastic) sheeting. Decontamination fluids will be contained for subsequent treatment or disposal.

APPENDIX E

RESPONSE TO COMMENTS

PROJECT REVIEW COMMENTS

Group IV RFA Workplan
NAVSTA Mayport

Comments from John Mitchell, FDEP Natural Resource Trustee, June 7, 1995

1. **The Executive Summary (p. iii) indicates the oil water separators will be evaluated under the Underground Storage Tank (UST) Program and in accordance with the state's underground petroleum rule (Chapter 62-770, F.A.C.). This may be appropriate, however, solvents and waste oils were often discharged into oil-water separators. Should contamination be discovered which is not petroleum based then that specific location should be returned to the Installation Restoration (IR) program.**

   We agree with the comment and the text will be changed to reflect this.

2. **Figure 2-1 (SWMU 47, Oily Waste Collection System), p. 2-3, should show the location of other SWMUs (i.e., SWMU 9) within the vicinity. Also, a smaller scale map should be made which better defines the site. This map should include the location of the lift stations and riser joints, along with near vicinity SWMUs. Delineating which portions of the line are gravity flow and forced flow should be shown.**

   The map will be revised to include the best available information on the Oily Waste Collection System.

3. **A figure showing the approximate sampling locations for all media should be included.**

   Actual sampling locations will be determined based on the results of the screening investigations, with the concurrence of the partnering team members.

4. **Figure 2-2 (SWMU 53, Sanitary Sewers in Industrialized Area), p. 2-11, should show the location of other SWMUs (i.e., SWMU 9) within the vicinity. Also, a smaller scale map should be made which better defines the site. All the sanitary sewer lines should also be shown on the map along with the portions of the line which are gravity flow and forced flow.**

   The figure will be revised to include the best available information on the sanitary sewers.

5. **Figure 2-4 (SWMU 55, Storm Sewers in Industrialized Areas), p. 2-23, only shows the 17 outfalls at the turning basin. Any other outfalls which may lead into retention basins, wetlands, the SJR and other surface water bodies should be shown, and sampling stations established at these locations. Also, other SWMUs in the vicinity of the storm sewers should be delineated.**

Also, on p. 2-24, the document states that "an inventory of the storm sewer system was completed in 1994." The storm sewer system should be included in this figure.

The figure will be revised to include the best available information on the storm sewer system.

6. **Section 2.4.1 (Exploration Program Summary - SWMU 55), p. 2-24, indicates sediment samples will be taken from the unlined drainage ditches which lead to 17 outfalls. As previously stated in comment #5, these outfalls are all in the Turning Basin. Any other outfalls should also be located and sampled.**

   Only outfalls that drain industrial areas of the base will be investigated.

7. **Section 2.4.2 (Sampling and Analytical Program - SWMU 55), p. 2-25, again mentions only the 17 outfalls in the turning basin. Refer to comments #5 and #6.**

   Also, the last paragraph of this section states that ecological toxicity testing may be required if contamination is discovered. This should indicate what parameters will be used to make this decision (i.e., SQAGs, ER-Ls, FSWQS, etc.) or make referral to the preliminary risk characterization section of the document.

   Only the industrial areas of the base are proposed to be sampled. The industrial activity on base in centralized at the Turning Basin the proposed outfalls are those which have not been previously sampled as part of an RFI or RFA. We see no need to resample the drainage to many of the outfalls.

   We will compare the sediment sampling data to either SQAGs or ER-Ls which ever is lowest. For surface water we will compare the analytical results to the FSWQS. The text will be changed to reflect this.

8. **Section 4.0 (Preliminary Risk Characterization), p. 4-2, recommends using the NOEL and PEL values of the SQAGs for sediment risk characterization analysis. Instead of using the NOEL values, we recommend using the TEL values.**

   We agree with the commentor and for sediment risk characterization analysis the Threshold Effect Levels will used. The text will be changed to reflect this.

Comments from Partnering Meeting, including Jay Bassett, USEPA

Need Details on Tracer Gas/Attached MSDS for expected Propriety Tracer Gas A

1. **Sanitary Sewer investigation needs to include areas of the base where Hazardous Material may have been used in the past but not now in use at that location.**

   There are no such known areas that would have discharged to the Wastewater treatment system. Per Cheryl Mitchell.

2. **Why was the Sanitary Sewer system included by A.T Kearny?**

   The sewer system was included as a SWMU because in addition to receiving domestic sewage the system also received wastewater from industrial operations including SIMA, AIMD, Commercial Shipyards, helicopter maintenance. Hazardous Waste was not discharged, however, wastes discharged included hazardous constituents including paint booth effluent (since eliminated), cleaning compounds, alkali soap degreaser, foundry cleaning solutions and oil water separator effluent.

3. **Oily Waste Collection System and Sanitary and Storm Sewers should be screened for solvents as well as petroleum.**

   The Sewer System samples will be screened on-site for VOCs, including both solvents and petroleum constituents. The investigation of the Oily Waste Treatment system using SCAPS should be sufficient to detect any solvent contamination because there should be petroleum contamination in combination with solvent contamination. If any contamination is identified the area will be sampled and the samples will be analyzed for all Appendix IX constituents. Storm System sampling will analyze for VOCs and SVOCs. No additional sampling or analysis are required for Group IV.

4. **The area of investigation for the Sanitary Sewer should be narrowed.**

   Much of the industrial and administrational area had the sanitary sewer repaired in 1991. The primary areas of investigation will be the aviation repair and maintenance facilities, SIMA, and Moale Avenue.

Comments from James H. Cason, FDEP RPM, August 15, 1995

1. **Figure 1-2: place a notation on the map that the Group IV SWMUs are dispersed around Mayport Naval Station.**

   We agree with the comment and the figure will be changed to reflect this.

2. **Figure 2-1 needs to better emphasize and differentiate the Solid Waste Management System (it is not evident in the figure) and the Oily Waste Collection System; please emphasize and label the OWTP and provide appropriate legend references. Future reports should also indicate the force mains, gravity and force sections, lift stations, etc., all to the greatest extent possible consistent with clarity (larger scale figures may be in order).**

   The figures will be updated to include as much detail as possible.

3. **Section 2.1.1: a short discussion of the "regular intervals" for testing force lines should be included. Will soil borings be taken at the lift stations, where overflows would be expected to occur?**

   Direct push technology (DPT) will be used approximately every 20 ft along the length of the force mains. A reference to this will be added to this paragraph. Soil borings will not be taken at lift stations, but DPT will be used to determine if petroleum contamination exists at each lift station.

4. **Section 2.1.2.3: I assume that the reason that screened intervals can be placed into the water table is that a portion of them will remain above and afford gaseous sampling. If this is the case, a short statement in this regard in the work plan would suffice. This comment also applies to Section 2.2.2.2, page 2-16.**

   The commentor is correct in his assumption and a statement regarding the screen placement will be added to the text.

5. **Section 2.1.2.4: in the discussion of the number of gas samples, the number of 480 is utilized. Will this many samples be taken? If not, how many will be taken and how will their location be chosen?**

   The number of actual sampling locations will depend on the number of defects identified by the video and tracer gas inspections. The number 480 is an estimate for budgeting purposes.

6. **Page 2-13: in paragraph 3, were the repairs that were recommended for the lines accomplished? Will these areas receive any sampling bias? Will defects noted in Section 2.2.2.1 be correlated with the mentioned repairs?**

   Yes, some of the areas of defects were repaired; these areas will not be re-investigated, the areas repaired will be identified the text.

7. **Section 2.2.2.3: will the full 340 sample points be utilized?**

   No, the number of samples is an estimate, sampling will only be done at known defects.

8. **Page 2-19: why will SVOCs not be analyzed in the soil-water samples?**

   The primary reason the sanitary sewer was included in the 1989 RFA was that solvents used in the industrial area may have entered the sewer. The primary organic contaminants of concern are VOCs. For this reason, the site will be screened using a field GC for VOCs. Twenty percent of the samples will then be sent off-site for confirmation analysis at a certified laboratory.

9. **Page 2-22: please confirm that the management of the oil-water separators under Chapter 62-761 has, or is capable of and will, assess past releases from the oil-water separators that occurred prior to being transferred to that program.**

   Releases are being investigated as the tanks are replaced.

10. **Figure 2-2 and Figure 2-3 are duplicates; they should be combined and perhaps renamed "Location of Industrialized Areas Containing SWMU 53-Sanitary Sewers and SWMU 55-Storm Sewers."**

    Figures 2-2 and 2-3 will be changed to include more detail on the Sanitary and Storm Sewers.

11. **Figure 2-5 needs to emphasis and a legend.**

    Since AOC A will not be investigated under the IR program, the partnering team agreed at the September meeting that this figure did not require additional detail.

12. **Page 2-27: same comment as 9, above, with respect to the assessment of releases prior to pre-Chapter 62-761, F.A.C. status.**

    See response to Comment 9.

13. **Page 2-28: RAP status; does the last paragraph belong in this document (is this the place for a recommendation)?**

We feel that this recommendation is appropriate at this time. The AOC will no longer be investigated or addressed under the IR Program.

14. **Page 3-11: regarding trip blanks, does "each shipment" mean each shipping container?**

The trip blank will be included in each shipping container used to ship VOC samples. The text will be changed to clarify this.

15. **Section 4.0: will preliminary risk screening be conducted at all Group IV SWMUs and AOCs, including those being managed under Chapter 62-761, F.A.C.?**

The Preliminary Risk Screening will only be conducted at SWMUs and AOCs being addressed under the IR program.

16. **Page 4-1: use the newer soil cleanup goals in the April 5th, 1995 FDEP memorandum Soil Cleanup Goals for the Military Sites.**

Agreed.

17. **Page 4-2: sediment analyses should be screened by reference to Approach to the Assessment of Sediment Quality in Florida Coastal Waters, MacDonald Environmental Sciences Ltd., November 1994.**

We agree with the commentor. The text has been changed to reflect this.

18. **Page 4-2: it is stated that guidance concentrations for promulgated Florida ground water guidance concentrations will be identified in the text. Will the non-promulgated values be ignored? Will they be considered?**

We will evaluate the data using both promulgated and non-promulgated values. The text has been changed to address this.

19. **Reference list: correct for Soil Cleanup Goals and MacDonald, 1994.**

The references have been changed.

APPENDIX F

SITE-SPECIFIC HEALTH AND SAFETY PLANS

SWMU 47, Oily Waste Collection System
SWMU 53, Sewer Pipelines
SWMU 55, Storm Sewer and Drainage System

ABB ENVIRONMENTAL SERVICES
SUMMARY SITE SAFETY PLAN

A. GENERAL INFORMATION

SITE: SWMU 47 (Oily Waste Collection System), SWMU 53 (Sewer Pipelines), and SWMU 55 (Storm Sewer and Drainage System)

SITE OWNER/CONTACT: David Driggers (SOUTHNAVFACENGCOM), Mike Davenport and Cheryl Mitchell (NAVSTA)

LOCATION: Naval Station (NAVSTA) Mayport, Mayport, Florida

PLAN PREPARED BY: Mark Lieberman DATE: Rev. 5/2/95

APPROVED BY: _____ DATE: _____

OBJECTIVE(S): To maintain health and safety during RCRA facility investigation field activities that include surface water, groundwater and soil sampling.

PROPOSED DATE(S) OF INVESTIGATION: _____

BACKGROUND REVIEW: Complete: X Preliminary: ____

OVERALL HAZARD: Serious: ____ Moderate: ____ Low: X Unknown: ____

B. SITE/WASTE CHARACTERISTICS

WASTE TYPES: Liquid X Solid X Sludge ____ Gas ____

CHARACTERISTICS: Corrosive X Ignitable ____ Radioactive ____

Volatile X Toxic X Reactive ____ Unknown ____

SITE DESCRIPTIONS: The following sections provide brief descriptions of SWMUs 47, 53, and 55.

SWMU 47, Oily Waste Collection System: The Oily Waste Collection system is a system of gravity pipelines, lift stations and force mains that convey oily bilge water collected from ships at the piers to the oily waste treatment plant. The system can be broken into two subsystems: the gravity feed system used to convey the oily wastewater from the oily waste risers at the pier to the lift stations, and the lift stations with force main pipelines that convey oily wastes to the Oily Waste Treatment Plant.

According to the RFA in 1989, the Oily Waste Collection System consists of pipelines that run parallel to the piers that line the shores of the Turning Basin. The pipelines that parallel the piers are the gravity portion of the Oily Waste Collection System. The risers that feed the gravity section are located approximately every fifty feet along the length of the entire pier system. The pier system consists of five piers named the Alpha, Bravo, Charlie, Delta, Echo,

and Foxtrot piers. The gravity sections of the Oily Waste Collection System feed four lift stations. These lift stations pump the oily waste to the Oily Waste Treatment Plant through force mains.

According to a 1992 Evaluation of the Oily Waste Collection System (Hendon, 1992) there are approximately 47 risers around the turning basin which feed the approximately 13,702 feet of six and eight inch gravity feed pipeline which surrounds the turning basin. The gravity feed pipeline feed four lift stations which pump the oily waste through approximately 9,960 feet of 6, 8, and 12 inch force mains.

In January 1990 the DFM (Diesel Fuel Marine) fuel line was broken during an excavation. The report on this break also noted the discovery of old oily waste product in the excavation area, indicating a previous product release. As a result of this discovery, integrity testing was conducted on the oily waste and fuel pipelines. Because the oily waste pipeline is a gravity system, a dye test was conducted and the results indicated that the oily waste line was not leaking. The testing of the DFM pipeline system for this incident and subsequent periodic pressure testing suggest that no apparent leaks are present.

Recently, the oily wastewater flow from the Fire Training Center (FTC) has been connected to the oily waste collection system at Echo pier. This was done in an attempt to reduce the oil and grease influent to the Wastewater Treatment Plant.

SWMU 53 Sewer Pipeline: The RFA describes the Sewer pipelines as the system that collects and transports wastewater from all areas of the station to the Wastewater Treatment Facility (WWTF). The WWTF is an NPDES permitted facility and is located to the south of the entrance to the Mayport Turning Basin. Like the Oily Waste Collection System (SWMU 47) the sewer pipelines are made up of gravity feed pipelines, lift stations, and forced main pipelines.

The RFA states that the sewer pipeline transports industrial wastewater to the WWTF in addition to the domestic sewage transported. The industrial operations that contribute wastewater flow to the WWTF include Shore Intermediate Maintenance Activity (SIMA), Aircraft Intermediate Maintenance Depot (AIMD), helicopter maintenance hangars, commercial shipyards and the ships berthed in the Mayport Turning Basin.

The 1989 RFA states that the wastes that could possibly be discharged through floor drains and sinks by these industrial activities include paint wastes, cleaning compounds, degreasers, foundry cleaning liquids, water from oil/water separators, effluent from the ship's CHT (Combine Holding Tanks). A WWTF influent sampling study conducted by the EPA in 1987 identified many hazardous constituents in the influent to the WWTF. Those constituents included chromium, nickel, chloroform, toluene, naphthalene, methyl ethyl ketone, benzene, 1,4-dichlorobenzene, bromoform, and phenols.

SWMU 55, Storm Sewer and Drainage System: As described in the 1989 RFA Report the storm sewer system at NAVSTA Mayport consists of underground storm sewer pipes and unlined drainage ditches. The storm sewer system conveys run-off to the St. John River, Sherman Creek, Lake Wonderwood, the Turning Basin and the Atlantic Ocean. Many of the storm sewer pipes that discharge to the surrounding surface water are fed by the unlined drainage ditches that are located throughout the entire facility.

The 1989 RFA report states that the flight retention ponds (SWMU 49), the boiler blowdown at building 250, and the Hobby Shop Drain (SWMU 20) are discharged into the stormwater drainage system. Both the flight line retention ponds and the hobby shop drain have been investigated in previous RFA sampling efforts. The unlined drainage ditch system that runs throughout the base is an possible recipient of any uncontrolled spills of hazardous material and leaks from underground systems such as the oily waste collection system (SWMU 47) or the oil/water separators (SWMU 54). For example, the RFA report included a report of a long-term intermittent discharge of an oily material from a stormwater outfall in the Alpha pier area thought to be from a fuel-line leak. This problem was assessed under Chapter 62-770, FAC (*State Underground Petroleum Environmental Response*) regulations on petroleum contamination, with the FDEP providing oversight.

The 1989 RFA states that the storm sewer discharges at NAVSTA Mayport are not regulated or controlled under the National Pollution Discharge Elimination System (NPDES), only the two outfalls from the WWTF are included in the permit. At the time of the RFA no inventory of the storm sewer existed, however, an inventory of the storm sewer system was completed in 1994 as part of the Stormwater Pollution Prevention Plan by Ogden Environmental and Energy Services.

PRINCIPAL DISPOSAL METHODS (type and location)

SWMU 47, Oily Waste Collection System. Oily Wastewater is conveyed in the system and may have been released to the environment because of unknown ruptures to the system. These ruptures may have released petroleum contaminated wastewater.

SWMU 53, Sewer System. Industrial Wastewater is conveyed in the system and may have been released to the environment because of unknown ruptures to the system. These ruptures may have released wastewater contaminated with paint wastes, cleaning compounds, degreasers, and foundry cleaning liquids.

SWMU 55, Storm Sewer and Drainage System. Stormwater is conveyed by this system and any uncontrolled spill may have contaminated the drainage ways. The spills could be fuel or other vehicle related fluids as well as all chemicals used in the industrial areas of the facility.

STATUS (active, inactive, or unknown)

SWMU 47, Active
SWMU 53, Active
SWMU 55, Active

HISTORY (Worker or nonworker injury, complaints from public, or previous agency action)

SWMU 47: no previous assessment activities have been conducted.
SWMU 53: no previous assessment activities have been conducted.
SWMU 55: no previous assessment activities have been conducted.

C. HAZARD EVALUATION

Chemicals to which personnel may be exposed are solvents and wastes containing volatile organic compounds, fuel hydrocarbons, and inorganic chemicals such as chromium, and nickel. A chemical hazard information sheet for each compound suspected of being present onsite is contained in Appendix A, Volume III, RFI workplan.

This site is suspected of supporting a large population of eastern diamondback rattlesnakes. Fire ants are also prevalent.

D. SITE SAFETY PROCEDURES

Map/Sketch Attached? Yes Site Secured? Yes

Perimeter Identified? Yes Zone(s) of Contamination Identified? Yes

PERIMETER ESTABLISHMENT. Access to Mayport NAVSTA is restricted at all points.

PERSONNEL PROTECTION.

TASKMINIMUM LEVEL OF PROTECTION.

All Activities Level D

MODIFICATIONS. Level C protection will be used as a contingency should photoionization meter or organic vapor analyzer (OVA) readings exceed 5.0 parts per million (ppm) in ambient air in the breathing zone and if identification of the compounds present cannot be made. If compounds can be identified the appropriate action level will be determined based on the appropriate permissible exposure limit (PEL) or threshold limit value (TLV).

Should it become apparent during any phase of the field activities that conditions are different from those anticipated, the Health and Safety Officer (HSO) will immediately withdraw all personnel from the site until health and safety conditions at the site are reevaluated.

SITE MONITORING INSTRUMENTATION. A photoionization meter or equivalent will be on hand at all times to monitor total volatile organics in ambient air surrounding exploration activities.

DECONTAMINATION PROCEDURES.

Personnel:Will be conducted as outlined in Volume III, RFI workplan

Equipment:Will be conducted as outlined in Volume III, RFI workplan between each boring and upon entry to NAVSTA and upon completion of the DPT program prior to the subcontractor leaving the NAVSTA.

MOBILIZATION AND SITE ENTRY. A contamination reduction area will be established onsite. Field work preparation, staging, and decontamination will take place in this area.

TEAM ORGANIZATION:

Team Member Responsibility

M. Jaynes Field Operation Leader (FOL)/Site-Safety Officer (May Delegate Site-Safety Officer)
To be Determined Sampler/Site-Safety Officer as designated by (FOL)
To be Determined Sampler
P. Layne Project Manager
F. Lesesne RFI Task Leader
Others As required

WORK LIMITATIONS (Time of day, etc.). During daylight hours only and as restricted by Mayport NAVSTA operations and security.

PERSONNEL PROTECTIVE GEAR, DECONTAMINATION, AND OTHER MATERIAL DISPOSAL. Personnel will use Level D protection. See Table G-1, p. G-55 (Volume III of the RFI workplan) for a list of personnel protective gear. Decontamination fluids will be containerized and turned over to base personnel to incorporate with their hazardous waste.